News By Teletype From 4 News Bureaus

National Petroleum News

News From Oil Industry Everywhere

VOLUME 31 WEDNESDAY, MARCH 22, 1939 NUMBER 12

Los Angeles Court Imposes $100 Fine On 'Price Cutters'

By Telegraph
N. P. N. News Bureau

LOS ANGELES, March 20.—Municipal Judge Landreth today imposed suspended sentences of $100 or 20 days in jail on four service station operators for alleged violation of the "actual" price posting law to which they pleaded guilty two weeks ago.

In placing the four operators on probation for six months, Judge Landreth declared that there was no question of criminal intent or moral turpitude involved but the law must be enforced, he insisted.

In the case of a fifth defendant, represented as a station employe, the judge imposed a fine of $10 or two days in jail on the defendant's plea that he would lose his job if placed on probation.

40 Cases Pending

Preliminaries in trial of other defendants who have pleaded not guilty to charges of selling gasoline at less than their posted prices will begin March 31. Others will follow shortly thereafter. Although Section 11-A (requiring posting of the "actual" sale price) of the Oil Substitution Act has been upheld in court, the trial of these operators is expected to develop into a final test of the law's constitutionality.

Judge Landreth said that approximately 40 cases involving alleged violations of the "actual" price provision have gone through his court in the past two weeks, indicating a real effort to break up the practice of under-the-canopy cutting of prices.

Pennsylvania Probe May be Snuffed Out

CLEVELAND, March 21.—All doubt as to the status of the Pennsylvania Oil Industry Investigating Commission would be ended, if the bill, introduced at Harrisburg last week, becomes law—it would abolish the commission and permit the unobligated balance of its appropriation to lapse.

Ask Commission To Hold Present Texas Allowables for 60-90 Days

AUSTIN, Texas, March 16.—The Texas Railroad Commission's statewide proration hearing here March 15 fell far short of the advance notices that it would equal, if not actually surpass, in importance to the oil industry generally the highly successful economics survey made at the hearing here last Dec. 12.

With even more top-flight executives of the industry present than were in attendance Dec. 12, the commission did these things:

1. Delved slightly into the question of placing refineries in Texas under the control of the commission.

2. Squinted hastily at the current statistical picture of the industry through the eyes of two well known economists and an equally well known statistician.

3. Listened briefly to recommendations for and against and change in Texas allowables for the next 60 to 90 days and for and against retention of the present two-day-a-week shutdowns.

4. Took a little testimony regarding specific fields, then adjourned.

Only three of the score or more of executives who had accepted the commission's invitation to be present and testify regarding their own company's current statistical position were called to the witness stand.

All of the others were asked to stand, raise their right hands and be sworn, and then to file up to the official reporter's desk and hand him their answers to the 11 questions the commission had notified them previously would be asked of them.

There was another noticeable contrast between this hearing and the one held last Dec. 12.

At that time many of the executives accepted the invitation to attend, despite the fact they were fearful they would be "put on the spot" while on the stand. The hearing, however, ran along smoothly.

Got Off the Track

The March 15 hearing, on the other hand, got off the track rather early and seemed never to find its way back. Considerable "sharpshooting" from the audience developed.

Some observers believed the sudden decision to cease taking testimony from the oil company executives was due partly to this "sharpshooting" and partly to the fact that time was running on and the commissioners wanted to complete the hearing without a night session, in order to attend a dinner for the interstate compact commission delegates that night. The compact commission members sat with the railroad commission during the hearing.

Some of the oil men present later expressed the opinion that, in view of the turn the hearing had taken, any attempt to get a large attendance of top-flight executives at any hearings in the near future would be all but futile. A sworn statement, it was pointed out, could be mailed to the commission with a result-

(*Continued on page* 14)

16 Major Companies Report on Storage Of 'Gas' and Crude

AUSTIN, Texas, March 16.—The industry's crude oil stocks picture continued to improve during the first quarter of 1939 but the motor fuels stocks picture clouded up slightly in the same period.

This is indicated from a study of the statistical data filed here March 15 with the Texas Railroad Commission by more than a score of companies operating east of California, the majority of them having some interest in Texas production or refining.

Sixteen major and semi-major companies were included in the list of those which replied to the 11 questions the commission had asked be answered at its statewide hearing to determine production allowables for crude for the next month or more.

The list was larger than was the one compiled at the Dec. 12 hearing of the commission. On the other hand two or three companies which filed data then failed to comply with the commission's request at the March 15 hearing.

Tabulating the statistics pre-

(*Continued on page* 15)

Looking Ahead in 1939 Oil Demand

Highlights in the oil industry's economic position, as it was discussed at meetings of conservation agencies last week in Austin, Texas. Details will be found in the accompanying articles:

Demand for all oils this year estimated to be about 6.2 per cent above 1938, which was 3 per cent less than 1937, pointing to record motor fuel consumption this year.

Motor fuel domestic demand for second quarter of 1939 estimated to be from 5.5 to 6 per cent above domestic demand for the same months in 1937.

If the present level of crude production is maintained for the next 60 to 90 days, various authorities estimated that, in view of estimated consumption, the industry would reach a satisfactory economic level by Sept. 1.

Gasoline stocks now placed at least 4,000,000 barrels above economic levels, various authorities stating from 20,000,000 to 27,000,000 barrels should be worked off during the summer.

Between 3000 and 4000 wells to be drilled in Illinois in 1939 and daily production, around 163,000 barrels late in February, to reach its peak late in year, unless new fields are brought in.

Plans 'Codes' Backed By Anti-Trust Laws

N. P. N. News Bureau

WASHINGTON, March 20.—A brand new anti-trust policy, designed to "reassure business," is a-borning at the Department of Justice. Its announcement is expected soon.

As nearly as it has been divulged thus far (it was discussed in general terms by Attorney Generay Murphy at a recent press conference), the policy will involve use of consent decrees where concerted action on the parts of groups within an industry are approved as necessary to insurance of orderly marketing conditions.

Under the plan, it is expected that civil suits will be filed "for the sake of record" in which industries seeking some kind of consent decree would be hailed before the bar. Then the conditions existent in the case would be presented to an advisory committee, set up in the departments of Justice, Agriculture, Commerce, and possibly some others.

Would Work Out 'Codes'

The government experts, with aid of the industrial representatives, would then work out what seemed to them the best set of trade practices — code, if you will — to meet the situation, which would be presented to the Court to be embodied in a consent decree.

Under the anti-trust laws, and justice department policy, it is difficult for a group representing any industry to get a "yes" or "no" answer to any concerted action that industry may contemplate — that is, the department is reluctant to tell anybody whether it will or won't prosecute users of the plan before it is adopted.

Possibly the Federal Trade Commission will have a place in the new set up, acting as a final "clearing house" for projected consent decrees before they are presented to the court. In this event, FTC's now relatively impotent trade practice conferences division might be expected to assume a new place of importance.

'Federal Control In Disguise'

To some business representatives, however, this plan has the earmarks of "just another move for federal regulation of business."

On what "terms", it is asked, would the justice department give its assent to code provisions proposed by an industry? Would the industry have to agree to stringent control of its labor relations, an arbitrary "ceiling" for its prices, the regulation of its manufacturing schedules, its use of transportation agencies, and control of a dozen other details of operation and management? Backing up compliance with such regulation would be all the penalties in the anti-trust laws for violation of consent decrees.

In other words, to these observers, the "consent decree" plan is just another "handle" by which the New Deal hopes to pull business under its control. Another "handle" was the federal incorporation law proposed by Sen. O'Mahoney which would prescribe conditions as to labor, financing and other operating details before a charter was granted to a corporation to engage in interstate commerce.

Several ideas which have been kicking around Washington for some time are seen as stones which could easily fit into the masonry of this plan. One is the "bureau of industrial economics" idea, which has been discussed as a possible outgrowth of the Monopoly committee. The bureau, conceivably, could be the advisory committee which would sit down at a table with industry and aid in the drafting of codes.

Another is the Business Advisory Council, which, while created by former Secretary of Commerce Roper, never got to be much more than an "idea" as far as results were concerned. The council, trimmed down to a size which would permit it to function, might be drafted as a complement of the government experts who were to consider the propositions of industries to work out their problems — at least, on broad questions.

Possibly these details will be worked out when the plan is finally announced—soon—or they may be left until later. Murphy has been reluctant to give details until the announcement is ready.

Won't End Prosecutions

He was emphatic, though, in declaring that adoption of the policy would not end all anti-trust prosecutions where "necessary," and said that prosecutions will be "vigorous but discriminating."

He said he believed the plan might tend, however, to prevent conditions necessitating anti-trust suits, as well as "needless friction" between the government and business.

Although the first news of the policy, as such, came from Murphy, Anti-trust Chief Thurman Arnold has, for some time, been talking of the department's "inability" to give approval to, or turn thumbs down on, plans submitted by industries.

Thus, it would seem, that the Arnold philosophy is at least in accord with that of Chief Murphy, which may serve to discount reports of his contemplated resignation — reports which were denied by Murphy at his latest press conference.

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Business Self-Government Proposed by Wiley Moore

N. P. N. News Bureau

WASHINGTON, March 20.—Wiley L. Moore, president of Wofford Oil Co., Atlanta, Ga., and one of the South's outstanding business men, has submitted to Commerce Secretary Harry L. Hopkins a plan for "business self-control" under codes, which, he says, should give business the definite assurance it needs in order to go forward.

The Moore plan, as outlined in a letter to Hopkins, follows briefly, in Moore's own words:

"The Administration should ask congress to pass an act to the effect that when two-thirds of the members of any industry worked out a constructive business program applicable to that particular industry, and submitted the program to your department (Commerce), and you satisfied yourself that the program tended to absorb unemployment and increase the purchasing power of those affected, the same could be approved by you as being for the best interest of the country at large, and when the program of any particular industry was approved by your department, the particular industry would be immune from prosecution, civil or criminal, as long as its members adhered to the provisions of the program as submitted and approved.

"In the event it developed that the program of any particular industry, or any particular feature thereof, was unfair or inequitable, the same could be altered, changed or revoked by the government after first giving the particular industry involved 60 days written notice. Needless to say, the programs of the various industries would be regarded as separate and distinct entities, non-touching in nature and operation."

Moore points out to Hopkins that, while the administration has done much to better the condition of labor and society in general, "the basic and fundamental rights of business were often inadvertently overlooked, with the result that an atmosphere of uncertainty and insecurity now permeates business."

"Can it be successfully argued," the Atlanta oil man's letter continues, "that the administration's apparent vindictive attitude toward business will prove beneficial to the nation? Is it reasonable to assume that the cause of labor can be advanced without regard for or consideration of the welfare of the nation's business? Is it within the realm of sound economic principles to say that the cause of one can be best served by sacrificing the other? I believe you will agree with me that these questions must of necessity be answered in the negative."

More on 'Varnish'

Reprints of this and former articles are available. More than 10,000 reprints of these articles have been sold, mostly in lots of 100. Oil companies are using these 'Varnish' articles to sell more lubricating oils. Prices for quantities of 100 or more upon request. NATIONAL PETROLEUM NEWS, 515 Penton Bldg., Cleveland, O.

Texas Senator Asks Probe of Rail Rates

By Teletype

WASHINGTON, March 21.—Sen. Sheppard, Texas, has introduced a resolution directing the Interstate Commerce Commission to investigate rates on shipments of Texas products, including petroleum, from points in Texas to points in freight zones to which Texas does not belong, together with comparative rates on such shipments for similar distances in other zones.

The resolution, which was referred to the Interstate Commerce Committee, aims at showing discrimination against movements from southern rail points.

Connally Bill Is Reported Without Holding Hearings

N. P. N. News Bureau

WASHINGTON, March 20.—Sen. Connally's bill (Senate 1302) to make permanent the Connally "hot" oil law has been favorably reported by the Senate Commerce Committee.

Such a report was recommended by a subcommittee made up of Senators Connally, Guffey of Pennsylvania, and Townsend of Delaware, several weeks ago, but several letters of protest against such a report had been received by the committee since the recommendation.

Commenting on these protests against a favorable report on the bill, the committee said in its formal report:

"Although some of those who objected to the measure two years ago and were fully heard by your subcommittee at that time continue to object, your committee is convinced that the preponderant opinion of State conservation authorities and of those engaged in the oil industry favors the permanent enactment of the law."

The committee also quoted the letter of Interior Secretary Ickes (N.P.N. March 15, p. 11) in its report favoring enactment of the bill into law.

Meanwhile, no hearings have been set, nor has any action been taken, by the House Interstate Commerce Committee, before whom the Dies bill (identical with Connally's) is pending.

Paul E. Hadlick, secretary of National Oil Marketers Assn., leader of opposition to the permanization of the Connally Act, is hopeful of obtaining hearings in the House, even though he was unsuccessful in the Senate.

Despite the fact that the Senate Commerce Committee favorably reported the Barkley "cooperative" pollution control bill (S. 685) several weeks ago, it has decided to hold further hearings on pollution, this time on the strict federal-control measure proposed by Sen. Clark, Mo., beginning March 22.

A bill to permit the coal industry to intervene in cases before the Federal Power Commission involving applications of natural gas pipelines to serve new territories (H.R. 5070), has been introduced by Rep. Dirksen, Ill., and referred to the House Interstate Commerce Committee.

Tax Reclaimed Oil

A bill declaring oil renovators to be "manufacturers" for the purpose of the federal tax on lubricating oils has been introduced by Repr. Wesley Disney, Okla.

The bill, HB-5133, would amend the internal revenue code by adding, "for the purposes of this chapter, any person who cleans, renovates or refines used or waste lubricating oil for sale, for hire, or for a valuable consideration, shall be considered the manufacturer or producer of such cleaned, renovated or refined lubricating oil, and such oil shall be subject to tax as new lubricating oil."

Mexican Parleys Bog Down, Richberg Returns to U.S.

N. P. N. News Bureau

WASHINGTON, March 20.—Almost a year to the day after Mexico expropriated the oil properties of American and British oil companies in that country, the first real steps toward negotiating a settlement of the controversy have apparently broken down.

Donald R. Richberg, Washington lawyer, once head of NRA, was the representative of the American oil companies in a series of six conferences at Mexico City with the southern republic's president, Lazaro Cardenas, which, according to reports reaching here, ended in no agreement.

Two possibilities remain, however. First, the discussions between Richberg and Cardenas are to be resumed late next month. In the meantime, it is expected, Richberg will confer with his clients, the American oil companies whose properties were taken, presenting to them Cardenas' views and perhaps carrying back with him further proposals.

Second, the oil companies have tacitly understood that the State Department will not step in with diplomatic representations until all efforts at private negotiation between the companies and the Mexican government have failed. Perhaps the failure to reach an agreement will spur the U. S. diplomatic services to some effort at aiding in the conciliation.

Very little has come out concerning the proposals, counter-proposals, and discussions between Richberg and Cardenas.

NPN's Log ON OIL LEGISLATION

Summarized oil legislative information below is based on reports received at Cleveland from Washington and state legislatures, which are deemed reliable although NATIONAL PETROLEUM NEWS assumes no responsibility for accuracy or completeness of this information.

Congress

SENATE BILLS

US SB-1806, Clark, Mo.
To construct a Bureau of Mines experiment station at Rolla, Mo. Mines and Mining Committee.

US S Res-108, Sheppard, Tex.
Directing Interstate Commerce Commission to investigate rail rates on Texas products including petroleum to other points in U. S. To Interstate Commerce Committee.

US S J Res-92, Nye, N. D.
Declaring California's offshore oil lands to be federal property and reserving them as a naval oil reserve. Lands Committee.

US SB-1869, Wheeler, Mont.
Railroad reorganization bill. To Interstate Commerce Committee.

HOUSE BILLS

US HB-5070, Dirksen, Ill.
To amend the Natural Gas Act to permit producers and distributors of coal, oil and other fuels to participate in proceedings under the Act. Interstate Commerce Committee.

US HB-5075, Osmers, N. J.
To repeal the undistributed profits tax. Ways and Means Committee.

US H J Res-213, Summers, Tex.
Providing an additional $2,000,000 for the Monopoly Committee. Judiciary Committee.

State Legislatures

Bills Introduced

ALABAMA

HB-20, Snyder.
Providing that no city, town or county shall assess any additional sales tax during life of said bill unless tax be approved by majority vote of people. To Ways and Means Committee.

CALIFORNIA

HB-2775, Meehan.
Imposes 1% gross transaction tax. To Revenue Committee.

GEORGIA

HB-798, Gross.
Imposing tax on consumption of natural gas.

HB-739, Ferguson.
Granting commissioner of roads of Camden County authority to regulate along any and all roads in county to enforce and adopt zonine ordinances to regulate the height, size and use of buildings and other structures. Passed House. To Counties & County Matters Committee in Senate.

SB-226, Harrell.
Amends motor carrier act to place limitation on capacity of motor vehicles transporting inflammable petroleum products on highways. To Motor Vehicle Committee.

ILLINOIS

HB-450, Howell.
Requires pipelines to furnish bonds to secure payment of proceeds of sale of oil and gas to persons entitled thereto. To Conservation Committee.

HB-465, Powell.
Imposes tax upon all persons transporting oil into state at rate of 2c on each gallon sold within state. To Conservation Committee.

KANSAS

SB-444, Oil & Gas Committee.
Provides for plugging seismic, core or other exploratory holes drilled for oil and gas.

MARYLAND

HB-631, Sleeman.
Imposing tax on kerosine and crude oil. To Ways and Means Committee.

MASSACHUSETTS

HB-1327. Providing additional man on trucks. Killed in Senate.

MINNESOTA

HB-1123, Antila.
Memorializes congress to pass Patman Chain Store Tax Bill. To Commerce and Manufacturing Committee.

SB-49. Defines, regulates and licenses itinerant merchants. Reported with amendment in Senate.

MISSOURI

HB-524, Taylor, et al.
Increasing penalty for violation of anti-nespotism statute.

NEBRASKA

No. 1. Provides that motor fuel shall contain 10% ethyl alcohol. Favorably reported.

No. 377. Continues 5 cent gasoline tax to June, 1941. Unfavorably reported in House.

NEW HAMPSHIRE

HB-293. Revocation of motor vehicle license and registration for non-payment within 30 days of motor fuel bills for fuel used in said automobile. Killed.

SB-38, Mahoney.
Relative to height of motor vehicles. To Revision of Laws Committee.

OKLAHOMA

HB-530, Hill.
Exempting from payment of "gas" tax, motor fuel used by state board of public welfare in distribution of commodities.

S. Con. Res.-5, Mauk.
Memorializing congress to increase "gas" tax from 1 to 2c and return additional revenue to oil producing states from which it came.

HB-535, Carrier.
Relating to corporation commission permits for motor vehicles.

HB-537, Duncan.
Relating to fair trades commission.

HB-544, Branan.
Relating to motor vehicle excise tax.

PENNSYLVANIA

SB-226, Edmonds.
Abolishing oil industry investigating commission, terminating terms of its members and lapsing unob-

ligated balance of appropriation. To State Government Committee.

RHODE ISLAND

HB-888, Magee.
Providing that one-third of gasoline tax receipts be used for relief. To Finance Committee.

HB-876, Brayton.
Regulating the use of highways by motor vehicles transporting property for hire. To Judiciary Committee.

HB-877, Tordoff.
Exempting fish and agriculture industries from gasoline tax. To Finance Committee.

HB-808, Romano.
Making it unlawful to sell or offer for sale kerosine in any business establishment where foods are displayed or sold. To Judiciary Committee.

SB-206, Simmons.
Relating to display of motor fuel price signs. Regulates price fixing, marking labels and tax price. To Judiciary Committee.

TEXAS

HB-856, Felty et al.
Asserting Texas' claim to tidelands 10.3 miles out into Gulf of Mexico.

CHANGED STATUS

ALABAMA

HB-201. Authorizing board of revenue of Montgomery County to levy and collect a privilege or excise tax on all persons, corporations co-partnerships, companies, agencies or associations selling gasoline or any devises or substitutes therefor. Approved.

HB-245. Regulates operation and registration of motor vehicles, also examination of operators. Approved.

HB-293. Lubricating oil tax. Approved.

HB-122. Providing for mileage tax on motor transportation companies. Reported with amendment in Senate.

HB-319. County Boards authorized to levy and collect privilege tax on all persons and refiners selling, delivering, withdrawing from storage, or keeping in storage for sale or delivery, gasoline, naphtha or other liquid motor fuels. To Local Legislation Committee in Senate.

ARKANSAS

HB-483. Regulating containers of liquified petroleum gases. Return requested by Senate and granted.

SB-488. Changes automobile registration date from November 1, to December 1. Passed House.

SB-488. Motor vehicle registration date changed to December 3, from November 1. Passed House.

HB-60. Changing gasoline tax rate in border zones. Killed by veto.

SB-317. Relating to the payment of oil royalties. Approved.

CALIFORNIA

HB-1926. Creating oil conservation commission. Recommitted to oil industries committee in House. Hearings begin March 21.

CONNECTICUT

HB-993. Tax paid on gasoline used for non-highway purposes may be refunded. Passed Senate.

HB-993. Allows refunds of gasoline tax for non-highway purposes. Passed House.

HB-795. Providing for increase from 1 to 3 per cent in amount of gasoline tax to be retained by distributors. Killed.

HB-1244. Providing reports by distributors to commissioner of motor vehicles before 15th of each month stating number of gallons sold or used in state in preceding calendar month and payment of tax. Killed.

SB-799. Providing for payment of one-third or receipts of state gasoline tax to cities and towns. Killed.

DELAWARE

HB-40. Decreasing gasoline tax. Killed in House.

GEORGIA

HB-406. Providing for gross income tax. Tabled. Reconsideration refused.

HB-242. Chain store tax exempting oil. Unfavorably reported and killed in Senate.

H Res. 6. Constitutional amendment to increase purposes for which state taxes may be levied. Favorably reported in House.

S Res. 57. Creating 18-member highway survey commission. To State of Republic Committee in House.

SB-226. Placing limitation on transportation of inflammable petroleum products on highways. Passed in Senate. Reconsideration refused in Senate.

IDAHO

HB-379. Providing $15,000 to University station for obtaining industrial alcohol from potatoes. Approved.

INDIANA

HB-286. Reducing gasoline tax from 4 to 3c per gallon. Killed.

HB-468. Exempts farm and cooperative trucks from state motor vehicle act. Approved.

IOWA

HB-277. Declaring natural gas pipelines public utilities and taxing 5c per 1000 cu. ft. of gas moving in intrastate commerce. Indefinitely postponed.

SB-184. Limits to 1200 gallons trucks carrying inflammables on highways; and 2000 gallons in cities and towns. Reported favorably, amended and passed in Senate. To Roads Committee in House. Favorably reported by House Committee.

KANSAS

HB-354, Malone. Liens on crops for petroleum products sold to owner. Reported out "do not pass."

HB-196. Prohibiting transportation of more than 1000 gallons of gasoline or other fuel over highways. Unfavorably reported in House.

HB-76. Collecting tax on all gasoline in excess of 20 gallons in vehicles entering Kansas. Passed House.

HB-155. Prohibits hauling of more than 600 gallons of inflammable petroleum products on highways between 7 PM and 6 AM. Unfavorably reported in House.

HB-223. Labelling of gasoline pumps with brand or words, "no brand." Reported with amendment in House.

SB-185. Corporation commission to control crude production and prevent discrimination. Passed Senate.

SB-52, McDonald & Dale. Kansas labor and products given preference. Passed as amended, now before House.

SB-76. Collects tax on over 20 gallons of gasoline in trucks entering state. Favorably reported in House.

KANSAS

HB-449. Method of refunding gasoline tax for non-highway use. Passed Senate.

HB-76. Relating to tax on entering state with more than 20 gallons of gasoline. Passed Senate.

SB-185. Corporation commission to regulate crude production. Reported with amendment in House.

MAINE

HB-786. Increasing gasoline tax one cent for old age assistance. Unfavorably reported in House.

HB-1801. Reduces registration fees 25% increases gasoline tax 1c. Unfavorably reported in House.

SB-306. Prohibiting sale of malt liquors within 500 feet of service stations. Reported unfavorably in Senate.

MASSACHUSETTS

HB-1327. Providing additional man beside operator on any semi-trailer unit or truck carrying 5 tons or more. Killed.

MINNESOTA

HB-394. Removing limit of July 1, 1939 on 4c gasoline tax. Withdrawn.

MISSOURI

HB-477. Revising present motor vehicle fuel tax law. Favorably reported in House.

HB-530. Increasing gasoline tax to 3.5c, reducing registration fees 50% on private automobiles. Reported with amendment in House.

HB-236. Pipelines classed as common carriers and subject to regulation by public service commission. Unfavorably reported in House.

NEBRASKA

Bill No. 12. Provides exemption from gasoline tax for non-highway use. Favorably reported.

Bill No. 377. Continuing 5c gasoline tax to 1941. Reported unfavorably.

No. 32. Increases amount for discovery of oil from $15,000 to $75,000. Killed in House.

NEW MEXICO

SB-130. Tax of 2.5c per barrel on oil produced. Killed in Senate.

HB-254. Requiring posting, and adherance of motor fuel prices. Prohibits selling below cost, misbranding or substitution. Approved.

NEW YORK

HB-1322. Price posting for motor fuel. Passed House. To Codes Committee in Senate.

SB-918. Making filing of bond by motor fuel distributors mandatory. Favorably reported in Senate.

NEVADA

SB-83. Places tax of 5c per gallon on diesel oil used in motor vehicles. Favorably reported and passed in House.

NORTH CAROLINA

HB-509. Regulates closing of filling stations on Sundays in Greene County. Unfavorably reported in Senate.

HB-242. Prevents motor driven vehicle from bringing into state more than 30 gallons of motor fuel. Unfavorably reported in House.

OKLAHOMA

HB-485, Basolo. Levying 4c excise tax on diesel fuel, liquified gas and other fuels not now taxed, and used for vehicle propulsion on highways. Passed House.

HB-503. Re-enacts sales tax. Passed House.

HB-342. Excise tax. Killed in House.

HB-357. Exempting gasoline from excise tax. Killed in House.

HB-84 and 91. Changing method of allowing gasoline tax refunds. Killed in House.

HB-485. Excise tax on diesel fuels. Passed in House.

HB-528, Patterson, Exempting from payment of "gas" tax, motor fuel used by state board of public

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Oil's WASHINGTON CALENDAR

Below are given the dates and notices of hearings, proceedings, new legislation, etc., which are of importance to oil companies. Notice is also given of regulations issued, interpretations of laws, new publications, etc., with information as to how readers may secure official copies of these.

HEARINGS:

Interstate Commerce Commission:

Further hearings on question of need for safety regulation for privately-operated trucks:

April 4—ICC Bldg., Washington, D. C.

April 6 — Railroad proposal to cut less-than-carload freight rates on petroleum products in southern states. (Atlanta, Ga.).

April 10 — Railroad proposal to cut less-than-carload freight rates on petroleum products in southern states. (Memphis, Tenn.).

Federal Power Commission:

March 27 — FPC assumes jurisdiction over Kansas Pipe Line & Gas Co. project (construction of natural gas pipeline in Kans., Nebr., S. D., N. D. and Minn.) and orders hearing on company's application to build the pipeline. (Coal interests petition to intervene denied but are allowed to participate in hearing).

April 17—Hearing on application of General Gas Pipe Line Co. of Indiana for certificate of public convenience and necessity to build natural gas pipeline from Ky. to Ind.

May 15 — Hearing at Helena, Mont., on application of Montana-Dakota Utilities Co., Minneapolis, to import natural gas from Canada into Montana.

EFFECTIVE DATES:

Federal Power Commission:

July 11—Order 59, amending rules of practice under Natural Gas Act.

MEETINGS:

March 21-24—Rivers and Harbors Congress.

May 1 and 2—American Trade Assn. Executives spring meeting.

REPORTS AVAILABLE:

"Barriers to Internal Trade in Farm Products", containing chapter on state motor vehicle legislation and regulation which hampers flow of interstate commerce. Prepared by Bureau of Agricultural Economics, 104 pages. Available in single copies free from Department of Agriculture, Washington, D. C. Copies in quantity, 25c each, order from Supt. of Documents, Government Printing Office, Washington, D. C.

"Statistics of Oil Pipe Lines, 1921-1937" (Statement No. 396, File No. 86-C-3, 42 pages). Gives in convenient form salient facts annually reported by pipeline companies to ICC since 1921. Write Bureau of Statistics, Interstate Commerce Commission, Washington, D. C.

welfare in distribution of commodities. To Calendar.

HB-535, Carrier. Motor vehicle transportation act To Motor Transportation Committee.

HB-536, Duncan. Fair trades act. To Manufacturing & Commerce Committee.

HB-537, Duncan. Creating fair trades commission. To manufacturing and Commerce Committee.

HB-485. Use tax on diesel fuels at same rate as gasoline tax. To Revenue and Taxation in House.

TENNESSEE

HB-958. Regulating retail sale of motor fuel and lubricating oil by requiring posting and adherance to posted prices for each. Provides fines. Approved.

UTAH

HB-195. Prohibiting price discrimination in sale of motor fuel. Approved.

SB-246. Extending gasoline tax to other motor fuel. Approved.

HB-195. Prohibiting gasoline price discrimination. Tabled.

SB-25. Excise tax of 4c per 1000 cu. ft. of natural gas. Killed.

VERMONT

HB-322. Raises gasoline tax 0.4 cent. Favorably reported in House. Recommitted to Ways and Means Committee in House.

WASHINGTON

SB-277. Imposes 0.25c tax on petroleum products. Amended and passed in House.

WEST VIRGINIA

HB-442. Authorizes persons severing natural resources to deduct from royalty proportionate share of tax. Becomes law without approval.

WISCONSIN

HB-62. Relating to maximum hours of labor for truck drivers. Killed.

HB-109. Relating to maximum speed limit for oil trucks. Withdrawn.

Status of 'Oily' Bills As Legislatures Adjourn

South Dakota

(Legislature Adjourned March 10.)

Bills Enacted

HB-302. Provides that expenses of administering the motor fuel tax law be paid out of appropriations made by legislature, and requires state treasurer on first day of each month, to transfer to general fund one-twelfth of amount so appropriated as set out in general appropriation bill, for administration of fuel tax laws. Bill also provides that treasurer, on first day of each month, shall first set aside out of said motor fuel tax fund, a sufficient amount to pay estimated refund claims for current month.

HB-222. Reduces penalties for violation of substitution and misbranding law.

HB-280. Provides that state treasurer, instead of the secretary of agriculture shall be ex-officio inspector of petroleum products approved.

HB-286. Provides that the state treasurer shall deposit revenues from inspection of petroleum products in the general fund. Under the prior law, ¼ of the revenues were placed in a petroleum products inspection fund. Approved.

HB-254. Provides 3.5% of funds collected in county for motor vehicle licenses shall be credited to state general fund. Under prior law this money was credited to state motor vehicle fund.

HB-153. Changes base of tax to number of stores or mercantile establishments included under the same general management, supervision, ownership or control, whether operated in the state or not. (Louisiana Plan). Also changes the rate schedule.

HB-230. Relates to deduction of sales tax from refunds of gasoline tax. Approved. (This measure has been repealed by SB-319 listed below).

HB-288. Permits director of taxation to allow returns and remittances be made quarterly instead of monthly. Approved.

HB-56. Limits quantity of inflammables to be carried in any single motor vehicle, trailer or semi-trailer to 15,000 gallons. Amended not to include shipments to points that are not on railroads and gives public service commission right to suspend to serve needs of any industry.

HB-202. Provides State Highway Commission may extend state highway system to include any street with limits of any city to make continuous route for any trunk highway.

HB-231. Provides 5% of fees collected from interstate carriers shall be placed in general fund.

HB-233. Provides that motor carrier "for hire" fees be paid into general fund.

HB-289. Lowers brackets and also highway compensation fees paid by motor carriers in lower brackets.

HB-32. Provides that law regulating securities shall not apply to any undivided interest, or certificate, based on an undivided interest, in all royalties, oil leases, or mineral deeds, where the interest or certificate based on such interest, offered for sale or sold, is more than 1/25 of the whole royalty, oil lease or mineral deed or any interest given in interchange for labor, material, and all machinery used in the drilling of a well on said lease.

SB-131. Imposes a tax of 4c per gallon on tractor fuel when used to propel any vehicle upon highways and subjects such fuels to same fees for inspection as for gasoline and kerosine, requires every dealer engaged in the business of selling such fuel to obtain a license and exempts tractor fuel from motor vehicle fuel tax.

S. J. Res.-5. Constitutional amendment prohibiting diversion of proceeds from imposition of any license, registration fee, or other charge with respect to operation of any motor vehicle upon any public highways and proceeds from imposition of any excise tax on gasoline or other liquid motor fuel.

SB-278. Imposes an excise tax on the privilege of use, storage, and consumption of tangible personal property at the same rate of per cent of purchase price as is imposed by the retail occupational sales tax (3%). Exempts gasoline on which a special tax has been paid.

SB-319. Amends provision relating to collection of sales tax on motor vehicle fuel by way of deduction from refunds.

SB-10. Requires motor trucks carry two flares.

SB-33. Permits electric lights or reflectors to be used instead of flares on trucks transporting explosives, gasoline, or other inflammables.

SB-55. Permits state to acquire land or material needed for state trunk highways after Jan. 1, 1939, and pay for same out of highway fund.

SB-315. Provides for co-operation with bureau of public roads in construction of secondary or feeder roads with federal aid.

SB-163. Authorizes counties to lease certain of their lands for the exploration and development of, and production of oil and gas. Approved.

SB-241. Authorizes certain public officers to enter into pooling agreements for unit development of oil and gas on public lands. Approved.

* * *

Indiana

(Legislature Adjourned March 10.)

Bills Enacted

HB-405. Grade separation measure providing that public pay 80% of costs and steam railroads 20%.

SB-175. Permits counties to spend up to 20% of receipts from motor vehicle highway fund to retire county unit road bonds. Approved.

SB-227. Rewrites law on issuance of motor vehicle operators' licenses. Approved.

SB-228. Amends law on registration of motor vehicles—does not change fees. Approved.

Bills in Governor's Hands

HB-171. Empowers auditor of state to order refunds to motor fuel dealers who have paid excessive taxes through error, and legalizes such payments as have been made in past.

HB-32. Changes registration date from January 1st to April 1st.

HB-446. Amending unemployment compensation act to include employes of establishments employing four or more persons; reducing waiting periods; making various other changes in law.

SB-226. State traffic council bill recodifying highway traffic laws.

SB-229. Limits license revocation for violation of drivers' financial responsibility law to six months. Removes court power to suspend such sentences. Penalizes clerks and judges for not notifying state bureau of judgments.

Bills which did not Pass

HB-216. To increase gasoline tax rate from 4c to 5c per gallon.

HB-286 and SB-165. To reduce the gasoline tax rate from 4c to 3c per gallon.

HB-531. To clarify rights of a surety on a gasoline dealer's bond.

HB-214. To impose a tax of 0.5c per barrel of 42 gallons upon every barrel of crude oil produced in state. Also provided for prohibition of waste in production of oil, for proration of production, and for prohibition of handling or dealing with illegal oil.

HB-153. To amend definition of term "store" in chain store tax by providing that it shall not apply to any place of business commonly known as a gasoline bulk plant where at least 80% of products sold or distributed, as measured by their dollar value, are products derived from petroleum. Such places would be required to pay a tax at the rate for a single store and the filing fee.

HB-9. To repeal Chapter 50, Laws of 1933, which levies a tax upon receipt of gross income.

HB-30. To reduce gross income tax rate from 1% to ¾ of 1%.

HB-34. To reduce gross income tax rate from 1% to ¾ of 1%.

HB-387. Would omit provision in present law transferring $1,250,000 from motor vehicle highway account to state general fund.

HB-428. To provide that $3,250,000 of net amount in motor vehicle highway account shall be set aside for cities and towns for road purposes. Under present law $1,250,000 goes to general fund and only $2,000,000 to cities and towns.

HB-2, 4, 6, 211, 216, 222, and SB-16 and 157. To repeal tire tax law (which was declared constitutionally by state supreme court).

HB-13, 10, 106, 121, SB-15 and 17. To reduce automobile registration fees.

HB-41. To make it unlawful for any commercial motor vehicle to be operated over highways of state from 12 noon on Saturdays to 12 midnight of the Sunday following, except vehicles transporting perishable goods.

HB-70. To defer motor vehicle registrations to July 1st.

HB-103. To increase from $2,000,000 to $2,500,000 the highway funds paid to cities for streets and also increase the counties' share from 1/3 to ½ of the remainder and increases the part of the counties' share that is paid over to second class cities.

HB-348. Itinerant merchants—licenses required.

HB-72. To create office of state inspector of petroleum and pipeline equipment. Inspector to be appointed by Governor and empowered to impose fees on number of barrels of refined petroleum.

HB-233. To provide for zoning areas adjacent to highways and for permits for signs and other structures with $1 fee. Exempts signs advertising own business to the extent of 80 square feet.

HB-510. To require public institutions to purchase gasoline, oil, and oil products produced from crude oil processed in state, provided cost is not more than 10% greater than if processed outside state.

SB-302. To give a surety on a gasoline dealer's bond all rights and powers possessed by state to enforce payment by dealer.

SB-168. To amend the Chain Store Tax Law by increasing the rates.

S J Res.-8.—Constitutional amendment prohibiting diversion of motor vehicle registration fees, licenses, gasoline license fees or excise taxes, and all other similar special taxes, duties or excises of all kinds on motor vehicles, trailers, motor vehicle fuel or motor vehicle owners or operators.

SB-6. To amend motor vehicle registration law by allowing a period of grace to March 1st.

SB-15. To provide for a tax, in addition to all other fees otherwise imposed, of 60c per 100 lbs. of gross weight for all trucks and buses including private trucks. Only exemptions are farm trucks, etc.

SB-85. To levy a weight tax on all motor carriers, in addition to all other taxes imposed by law.

SB-185. To provide for mandatory motor vehicle insurance.

SB-206. To extend the 1935 act prohibiting interference with free commercial flow of farm products to cover all commodities in trade or commerce and in movement on streets or highways.

SB-273. To increase maximum allowable length of single vehicles to 50 feet. Also provides for increase in maximum gross weight on any two or more consecutive axles and increases maximum allowable weight on any wheel and any axle to 9,000 lbs. and 18,000 lbs. respectively.

SB-297. To create office of state oil commissioner, appointive by Governor, to supervise pipelines.

National Petroleum News

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Published every Wednesday by The National Petroleum Publishing Co.

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FOUNDED 1909
Member of Audit Bureau of Circulation and Associated Business Papers, Inc.

Publication office: 1213 W. Third Street, Cleveland, O.
Telephone, CHerry 7672 Cable Address, Plattoil, Cleveland

NEWS BUREAUS

New York, 50 W. 50th Street, Telephone, Columbus 5-1516 and 5-1517.
Chicago, Buckingham Bldg., 59 E. Van Buren Street, Telephone, Harrison 5901-2-3.
Washington, D. C., 1002 National Press Bldg., Telephone, NAtional 0654.
Tulsa, Okla., 904 World Bldg., Telephone, 3-7132.
Los Angeles, 610-A Hillstreet Bldg., 815 South Hill Street, Telephone, VAndike 2845.

Subscription rate $3 per year in United States and Mexico; $4 in Canada; $4.50 Foreign Countries. Current copies 10 cents, except special issues; back copies more than two months old 20 cents per copy.

Texas Follows its Traditions To Further a Free Oil Industry

By WARREN C. PLATT, Editor

SAN ANTONIO, Texas—It is probably only natural and quite fitting that the oil industry and the state of Texas have united in making the first big fight of American history to keep a vast private and non-utility industry from going under the absolute control of a federal government 2000 miles away.

The geography of the state alone argues against restraints. You can roam for hundreds of miles across its plains, hills, mountains and deserts without having to climb a single fence. If the "rights" of some one else appear to trouble you, one just moves a few more miles out by himself.

Then the sun of Texas' cloudless skies shines so many days on its temple of liberty, the famed Alamo Mission church, a couple of blocks from where I write. That sun seems to bathe in eternal splendor not only that landmark to liberty, but the love for liberty in every Texan's heart.

Those of us living in the foggy and dark wintry regions of the north, do not seem to have the same vivid conception of a battle for liberty that so many have down here, for there are living today men whose fathers and grandfathers participated in the great struggle by which Texas became a republic. For ten years or so she was a separate nation, among the nations of the world, then Texas joined the United States. The dignity of that separate status has never been lost sight of in Texas history.

But probably enough of this Texas sunshine and of her vast open spaces. However, one cannot help feel as if he had been released from some kind of a prison when he escapes from under low, heavy cold skies, to Texas and all her "wide open spaces" and the aforesaid "cloudless skies." You do stretch your arms as well as your imagination where there is room to do so.

The forepart of this week over at Austin, named for one of Texas' liberty battling heroes, the oil men of state and country met with Texas oil authorities and discussed ways of bettering Texas' conservation regulations of crude oil. The state's new governor, ex-business man Lee Daniels rather sounded a happy note to the gathering when he announced that down here in Texas they "wanted to keep the oil industry in a profitable condition." Not many public officials say as much as that these days and when some at Washington try they seem to use weasel words.

These gatherings of oil men to discuss improvement in the state's conservation measures have a national importance that probably few outside the industry realize. If they are successful in not only producing the oil as cheaply as possible and at the same time conserving it against all wasteful practices, including bringing it to market when it is not wanted except at a ruinous price, then the chance of various national government officials at Washington getting their hands on the oil industry will be reduced.

While state officials and oil men were planning at Austin how to further improve the technique of conservation, some 600 of the country's outstanding oil engineers and geologists met in this city, in the annual meeting of the Southwest District Production Section of the American Petroleum Institute.

Here they reported on further improvement in scientific production methods by which oil conservation has been made to work and only through which can conservation be improved and the threat of federal government control held off. Federal government, speaking of it impersonally somewhat, is not supposed to be so much convinced of its own greater skill in taking over the oil industry and improving its "conservation" as it is suspected of longing for the extra power and dollars that control of such a big industry would bring various individuals and party political machinery. Federal control of the oil industry would certainly be the beginning of the day of nationalizing pretty much all industry.

If half the oil industry's production were in some other state than Texas the oil industry might be well on its way to Washington with a noose around its neck. Take some of the eastern and northern states, for instance, where the Socialistic and even Communistic ideas are pretty strong and a vigorous percentage of the state's population is on WPA and other government payrolls and the story would undoubtedly be much different. We would hate to see all of Texas's present production, which is half of that of the United States, and all of its potential production, which is much more than half, set down in the state of the oil industry's birth, Pennsylvania. What between the radicals, the alleged labor unions and the smelly political machines, oil would certainly be a sad industry. Besides it would be but a few miles from Washington. Heaven be praised that this country out here is 2,000 miles from Washington and not getting any nearer either, politically speaking.

Of course Texas has not always been kind or fair to the oil industry. Various of its state officials in the past have not been above cutting corners to nick fame or money off it. One of the most disgraceful proceedings was when the state some years ago filed suit to oust all the oil companies that had subscribed to the code approved by the Federal Trade Commission. Texas has a screwy anti-trust law under which its officials rebelled against the oil code that was blessed by federal authority. The suit had a bad odor around it, an odor of special attorney fees like other state suits against the oil industry in the past. This last case was settled last fall by payment of a fine to the state and a modest attorney fee. Maybe the smallness of the attorney fee will make such suits less interesting in the future?

As the oil industry has grown in this state, the officials have become more and more conscious of the tremendous responsibility placed upon them. The state not only collects big taxes directly from oil and the oil supply companies but the industry supports many hundreds of thousands of people with good wages. There is no question but that the people of Texas fully realize that if they do not fairly and intelligently protect and nurture this industry based on their greatest natural resource, the federal government will step in and grab it and that will end forever the state's advantages from oil.

So today, with half the raw material to supply a 17 billion dollar industry already discovered within its borders, we

find Texas and its officials demonstrating an excellent job of approaching and undertaking to solve one of the greatest problems of government and business in our history and doing it in a truly democratic way. That is the reason for all the meetings and hearings that have been going on down here.

The "proration" may be a few barrels too high or too low, the wells per acre may be too few, but these are details in the big problem. So far the state and the oil industry have succeeded in preserving pretty much the original gas pressure on the new fields of the last few years and they have built up the gas pressure on many old fields, thus actually saving to the country as a whole a good many hundreds of millions of barrels of oil, to say nothing of having been able to lay down a few fundamental rules for future oil fields.

C.I.O. Hi-Jacks a 14-Man Refinery

The attack of the C.I.O. Oil Workers Union on a small California refinery, employing only 14 men, seems to be in the union's best form. The union does not use reason but just force, even though the force is entirely illegal and even though a court intervenes on behalf of the American citizens who do not belong to the union.

In the meantime the use of force—dynamite—continues to be a prominent part of the dispute between the same C.I.O. Union and the Mid-Continent Petroleum Corp. at Tulsa where there has been a "strike" since before Christmas. At Tulsa soldiers are trying to preserve the rights of citizens who are not members of the union.

Some day maybe it will dawn on some of these alleged union leaders that the great mass of American citizens, not just the "Economic Royalists" nor those at the bottom of the income ladder, really have some rights and that they want to not only exercise them but preserve them.

A man is entitled to own a place of business and operate it without a "union" barring entrance to it.

Men are entitled to work at that place of business without being intimidated or even argued with beyond their own personal wishes, as to whether they should accept that employment.

The owner of this place of business and his workmen are entitled to have their products offered for sale without interference by unions with their customers.

In short, men are protected by law, when they go their lawful ways and they can so go in absolute peace if they choose. Pickets have no "right" to interfere in anyway, not even to harrangue if the citizen does not care to be thus addressed.

In this small California refinery there is no labor "dispute." The 14 employes do not want to join a union. They say they are satisfied with their wages and hours of work. But the union says they must join and pay tribute. So 100 "pickets" blocked entrance to the refinery until a court interfered. Then tacks were thrown on the drives and rocks showered on the place, all presumably a part of the usual "moral suasion" that has cursed this country's union movement.

Now it is reported that the union truck drivers may be prevailed upon to quit serving this refinery until these 14 American citizens join what they do not want to join and pay dues that they do not want to pay.

It has been necessary to call in the police and install armed guards to protect the lawful rights of these American citizens against this C.I.O. union.

The American public—the rank and file—are slow to anger and they are patient with those who are trying to better themselves even though they step over the line of lawful conduct occasionally, but these labor "leaders" can rest assured that as America views the dictators abroad, and contemplates the threat of certain dictatorial conduct in this country, it is not, peacefully at least, going to acquiesce in a dictatorship of labor, any more than in one of Fascism, Nazism or Communism.—W.C.P.

Indiana Jobber Convention Devotes Itself to Business

INDIANAPOLIS, March 20.—The successful retailer today must carefully consider such factors as quality, service, price, courtesy, value and reliability from the consumer's viewpoint, said Louis D. Young, National Advertising staff of Scripps-Howard newspapers, Indianapolis, at the opening of the spring convention of the Indiana Independent Petroleum Association.

Backing up his contention with chart and illustration based on the buying habits in 52,000 homes in 16 cities throughout the United States, Mr. Young pointed out that where retailers gave these factors special consideration sales showed an appreciable increase. He stressed the importance of such factors as courtesy, service and reliability, particularly in regard to the service station.

It was Mr. Young's conviction that many potential sales slip by merely through lack of efficiency and alertness on the part of the service station operator.

More careful individual analysis of these factors in the light of the buyer's likes and dislikes would undoubtedly effect a more favorable consumer reaction and result in increased sales and profits to the oil jobber and retailer, he said.

Following Young's address, Warren C. Platt, publisher and editor of NATIONAL PETROLEUM NEWS, pointed out several factors directly affecting profits within the industry, including varying costs of transportation; varying cost of crude; financial plight of many small refiners, and more direct delivery service resulting in lower cost. He pointed out that profits should be figured on a cost basis with a small percentage of the profit allowed for reserve.

Iowa Plan Blamed

Following Platt's address a general "quiz session" was held dealing with such questions as:

"Has the efficiency of the service station suffered since the adoption of the Iowa Plan by major companies?"

The overwhelming majority of those present voted an emphatic "yes" to this question.

Other questions dealing with the effect that the introduction of the new 67-octane third grade gasoline has had on "house-brand" profits to the dealer and the probable introduction of a 75 octane gasoline as a "house-brand" gasoline in the middle west, received a variety of comments from the audience.

Following a banquet in the evening, a floor show was presented and the entertainment ended in a grand community chorus.

H. H. Linsmith, General Outdoor Advertising Company, Indianapolis, lead-off speaker of the second day's session, stressed the economic and social factors in relation to trade and traffic. He pointed to the gradual development of rural movement as a factor of increasing importance to the gasoline retailer in that it necessitates the purchase of more motor cars with a consequent increase in gasoline consumption. He cited figures compiled by the traffic department of the Audit Bureau of Circulation showing a marked increase in the flow of traffic to business and entertainment centers in the city of Indianapolis itself within the past five years. "People will oftentimes travel far out of their way just for the sake of adequate parking facilities," he said.

Citing the "impulse buying" of the traveling public who "fill-up" only when the gas tank is nearly empty, Linsmith pointed out that it would be to the distinct advantage of each individual jobber and service station operator to devise ways and means of retaining this transient trade as regular customers.

Next speaker was E. J. Gallmeyer, vice-president and sales director of Wayne Pump Co., Ft. Wayne, who decried the lack of individual thinking and planning on the part of the oil jobber on merchandising problems. Citing the 5,500,000,000-gallon increase in gasoline consumption within the past 10 years, Gallmeyer stated that "vast opportunities" in this "depression proof" business are oftentimes lost merely through "screwball thinking" and excessive influence from outside environment.

Referring to the pump island as the most valuable spot in the world to the gasoline retailer, he said, that it is imperative that the service station operator exact a "better than average return from average people."

'Hide Behind Brick Wall'

Emphasizing the lack of spirit and color in service station merchandising, Gallmeyer said "we are hiding behind brick walls the very products and services that we want to sell."

Co-operation, not "chiseling competition," should be the goal of the oil jobbers and retailers

if they expect to reap the greatest profits, he said.

The concluding speaker of the session, George Biggs, in charge of sales promotion and training, Continental Oil Co., Ponca City, Okla. stressed the need of a greater spirit of optimism within the industry. He said that his company was setting aside a $2,000,000 appropriation for a vast expansion program this year and next.

Pointing to the business man as "the most important factor in civilization," Biggs stressed the need of individual initiative and enterprise. He said that the high percentage of business failures is due largely to the violation of some of the common sense rules of doing business.

Biggs stated that anyone starting up his own business, whether it be in the petroleum industry or any of the other major industries, could be reasonably assured of his ultimate success if he paid close attention to the following points: Good merchandising habits; efficient service; sound advertising policy; good selling habits; proper accounting methods; adequate knowledge of credits and collections and adherence to the principles of sound financing.

The program concluded with the raffling off of prizes.

California Producers Plan New Program to Cut Output

N. P. N. News Bureau

LOS ANGELES, March 18.—California's voluntary proration machinery will go into the repair shop between now and April 1st for a general overhaul and rehabilitation along lines scheduled to make it more workable and attractive in the eyes of oil operators throughout the state.

Groundwork for this action was laid at a special meeting of the central proration committee in Los Angeles March 17, where results were announced of a statewide poll of some 1050 oil operators for their reactions to the proposed modification of curtailment efforts as advanced by a fact finding committee a week ago. Ballots asked whether operators approved "in principle."

Although less than 16 per cent of all operators in the state responded to the call for a vote, allowable production of oil represented by those who did return ballots totaled nearly 70 per cent of the 600,000-barrel figure set for the state.

E. E. Pyles, chairman of the emergency executive committee, which, together with the fact finding committee completed a three month study of curtailment and its problems on the west coast reported on the balloting.

While 150 operators with 286,996 barrels of allowable production indicated acceptance of the 13-point recommendations for improving the California curtailment set-up, provided the proposed allocation formula was modified, the voting did not measure up to hopes for an industry-wide expression of opinion on the proposal.

The suggested classification of producing wells in the state into three groups, ranging from those with potentials of less than 25 barrels a day, which would be excluded from curtailment, up through the intermediate grouping, to the wells with potentials in excess of 1000 barrels daily, was the main point of argument against the recommendations.

Members of the Fact Finding Committee, present at the meeting, explained this suggestion for curtailment of wells with different potential capacities was not considered as a formula, but as the basis for further study designed to give a more equitable plan for distribution of allowable production.

W. H. Gies, an oil industry representative on the committee, pointed out that the present method of determining allowables was highly complicated. The suggested plan for establishing allowables on a graduated percentage of potentials ranging from 25 to 1000 barrels a day, has considerable merit, he added.

He said a study of producing wells in the state showed 7700 wells could not make even a minimum allotment of less than 25 barrels a day; that 3400 wells could make 25 barrels a day and perhaps something over. He doubted that the so-called formula would have caused any material disturbance in the curtailment picture.

Considering results obtained in the statewide ballot of operators and the allowable production represented, Pyles said the emergency committee felt its duty was to recommend that the Petroleum Fact Finding Committee's recommendations be accepted "in principle," except for the so-called formula.

Furthermore, that upon election of representatives to the Central Committee, as prescribed in these recommendations, modification should be made in the formula along lines suggested by operators who did not approve the allocation method.

The meeting approved these recommendations and referred the fact-finding report to the allocation and administrative committees of the central proration body for further study. They will report back on March 28.

On a motion by J. U. Stair, Shell Oil Co., the central committee agreed to the election of entirely new field committees—chairmen of which make up the central committee. Lawrence Vander Leck, chairman of the central committee, appointed the following operators to the election board: H. S. Stark, chairman; Ross McCollom, Emil Kluthe, W. C. Whaley, William Keck, Jr., R. M. Sperry, W. H. Fies, Warner Clark and Joseph Jensen.

Dana Hogan, Hogan Petroleum Co., and a member of the Fact Finding Committee, said the recommendations for modification of proration procedure were designed to perpetuate voluntary curtailment in California. He believed, however, something must be done to stop the driling of unnecessary wells on proven prolific property.

Phillips Reports 8% Gain in Sales In '38 Statement

N. P. N. News Bureau

CLEVELAND, March 21.—Net profit of Phillips Petroleum Co. for 1938 operations was $9,049,122, equal to $2.03 a share, as compared with net profit of $24,113,874 in 1937, equal to $5.42 a share.

The company made notable additions to its raw material resources and operating facilities in 1938, it reported, and of these additions its new underground reserves of oil and gas alone were estimated to be worth several times its 1938 net profits.

At the end of 1938 the company reported it was in the strongest financial position in its history, current assets totaling $56,562,787, of which $28,054,337 was in cash, the total being $10,717,644 more than at the end of 1937. Stocks of crude and refined products decreased 2,069,360 barrels in 1938.

Barrel for Barrel

The company should soon be marketing a barrel of finished gasoline for every barrel of crude processed, stockholders were informed, based on "present plans for further utilizing our waste gases." Last year the company's three refineries processed 15,861,073 barrels of crude. The finished refinery output, after blending with polymerized and stabilized natural gasoline, was 14,516,908 barrels.

Two new natural gasoline plants were built last year, and the efficiency of others was increased by new equipment and added gas gathering lines.

Sale of finished products last year was over 8 per cent higher than in 1937, an all time high for the company of 1,089,243,877 gallons. The company markets most of its products through 14,167 retail outlets in 22 central states, and ships special products to nearly all sections of the country.

Tire, battery and accessory sales continued to increase last year, and the reports shows the dollar value of sales 7 per cent higher than in 1937.

A substantial gain was made last year in sales of "Philgas," the Company's liquefied petroleum gases.

'More Authoritative Control'

Unless the Interstate Oil Compact is given power to restrict crude production more nearly to demand, and is expanded to cover all oil producing states, the report stated "a more authoritative method of control should be devised."

The "antiquated Sherman anti-trust law" is operating contrary to the purpose for which it was intended, the report noted, and is really promoting practices detrimental to industry and the general welfare of the nation.

"There should be established, without delay, a governmental agency with power to sanction and enforce agreements made within industrial groups," the report continued.

Encouraging Business Signs

An encouraging sign on the horizon, the report noted, are indications that fear is being banished and confidence restored through more co-operation and a better understanding between government and business leaders.

The 1939 outlook is better, the report notes, and "with the continued reduction in crude oil stocks and the maintenance of gasoline stocks at normal working levels, it is reasonable to expect an increase in prices during the heavy consuming season resulting in increased earnings for the year.

"Our company, with its low-cost operations, is in an excellent position to realize full benefit from these improvements and from any upward trend in general business," the report stated, signed by Frank Phillips, chairman, and K. S. Adams, president.

L. B. Simmons Elected President of W. P. R. A.

By Telegraph

SAN ANTONIO, March 21. — Members of the Western Petroleum Refiners Association here today concluded the 27th annual meeting with the election of L. B. Simmons, of Duncan, Okla., president. Simmons is president of Rock Island Refining Co., and has been a director in the association for several years. He succeeds C. M. Boggs, of Arkansas City, Kans., president of the Kanotex Refining Co., who declined to serve again after having held the post for four years.

Vice presidents named are R. W. McDowell, of Tulsa, Mid-Continent Petroleum Corp.; T. M. Margin, of El Dorado, Ark., Lion Oil Refining Co.; C. L. Henderson, of Wichita, Kans., Vickers Petroleum Co.; and C. W. Cahoon Jr., Wichita Falls, Tex., Olney Oil and Refining Co. H. T. Ashton of St. Louis Lubrite Division, Socony-Vacuum Oil Corp., was named chairman of the Finance committee.

Members also approved report of nominating committee which made several changes in the list of the board of directors in order to get a larger representation of technical men on that board.

This was in line with the association's plans to focus attention in ensuing year more thoroughly on technical, statistical and legislative activities. The members also approved appointment of a new and permanent committee on research and development.

Scales Speaks

The oil industry has been too prone to stage its family quarrels right out before the public, to the detriment of the industry in the public's mind, Victor Scales, of New York, publicity director of the American Petroleum Institute told the refiners. That has prevented the industry from obtaining the recognition it deserves from the public for its contribution to the public's welfare, he said.

Scales talked on "New Attitudes", in which he explained the program of public relations work the Institute is undertaking under the direction of its newly reorganized Public Relations Committee. Scales is secretary of that committee.

He compared the technique of sales effort of business and industry with what should be the technique of public relations work. He said that, while sales effort is direct and positive, public relations work should never be obvious and the results are intangible.

The sales effort ends with the completion of the sale, he said, while that of public relations has only a starting date when the sale is made.

Glenn Griswold, of Glenn Griswold Associates, Inc., told the refiners that business now was in just about the same position it was in a year ago when he appeared on the WPRA program. At that time he said that there would be a sharp upturn in business a little later in the year. It started, he said today, along in June last year. This year, however, he said, the upswing is going to come earlier and move even faster than it did a year ago. The present hesitation is going to run its course sooner and business is going to have a very substantial upswing and a greater measure of profits, he predicted.

Griswold, himself engaged in public relations work, took up where Scales had left off and said the oil industry has only a short time in which to do its job and that the industry is in the most vulnerable position of any business today, despite the fact it has the greatest and best story of any industry to tell the public.

Fayette B. Dow, Washington counsel for the Western Petroleum Refiners Assn., in his paper, reviewed the public announcements of the anti-trust law enforcement policies. In drafting that review he took apart the eight public addresses of Thurmond Arnold, assistant attorney general in charge of anti-trust work, and the 21 official announcements of the Department of Justice in the past year and grouped them under chapter headings. His paper was, however, composed of direct quotations of the addresses and announcements with no interpretative remarks of his own.

President Clyde M. Boggs, in his annual address, reviewed briefly the association's work the past year.

* * *

Catalytic Refining Talks Feature Technical Program

By Telegraph

SAN ANTONIO, March 21.— The hundred or more plant operators who attended the Western Petroleum Refiners Association's technical meetings here were treated to a thorough, although off the record discussion of the newest developments in thermal cracking, and the use of catalysis in cracking, reforming and polymerization, descriptions of types of steels being required and methods of treating the products.

Considerable interest was shown by the plant men in the paper on "Catalysis, Octane and Economics" by Wright W. Gary of the M. W. Kellogg Co. The speaker explained that his paper was primarily a progress report of experimental work that has been done recently.

Gary pointed out the trend toward higher octane motor fuels and said that the experimental work showed catalytic cracking and reforming could be utilized to bring the octane value of the refined product up within the range of 80 to 90. The products, he said, were stable, of good color and free of sulfur regardless of the type of charging stock used.

The speaker also discussed the types of catalysts used, stating that in most of the operations it had been indicated synthetic catalysts gave better performance than did the clays.

The plant men plied Gary with questions as to costs. He said that indications were the cost of catalytic cracking unit probably would soon get down to about the cost of a thermal cracking unit. The cost of operation, he said, appeared to be six to eight cents a barrel of charge in the larger sizes of equipment. Yield based on volume of charging stock which was an East Texas heavy naphtha, the speaker said, was 75 per cent on a volume basis of 90 octane gasoline.

Dr. E. R. Smoley of The Lummus Co., in his paper on "Thermal Cracking Developments" gave detailed descriptions of two recently completed units, one of 14,000 barrels capacity in California and the other the 22,000-barrel plant for the Pure Oil Co. at Smiths Bluff, Texas. Due to the fact that corrosion was a problem at one of the plants, Dr. Smoley said, considerable alloy steel was used. Operating costs were in the order of five to six cents per barrel of charge. The speaker said in reply to the inevitable question raised at these meetings of "what will it cost".

Martin Fleischmann of the Timken Roller Bearing Co., discussed at some length the various types of steel alloys now being used in some refinery construction work.

W. B. Ross and L. M. Henderson of the Pure Oil Co., prepared a paper on "The Action of Inhibitors on Polymer Gasoline," which was presented by Ross. The authors pointed out that polymer gasoline is more susceptible to atmospheric oxidation, than is ordinary gasoline but that experimental work and actual operations had shown that stabilization of gasoline toward gum formation is easily and satisfactorily accomplished by addition of inhibitors.

Hubbard Heads A.P.I. District

By Telegraph

SAN ANTONIO, Mar. 20. — The spring meeting of the Southwest District Division of Production of the American Petroleum Institute closed here March 17, with the election of E. P. Hubbard of Houston as chairman for the ensuing year.

Other officers chosen were R. L. Carruthers of Beaumont, vice chairman for Gulf Coast; Harold Decker of Corpus Christi, vice chairman for southwest Texas; L. A. Ogden of Fort Worth, for North and West Texas; T. A. Johnston of Shreveport, for Arkansas and North Louisiana; C. C. Staley of Hobbs, for New Mexico; J. P. Straight of Gladewater, for East Texas and J. E. Teague of Houston, secretary-treasurer.

Axtel J. Byles of New York, president of the American Petroleum Institute, recommended four steps which he believes will improve conditions for the oil industry after declaring that the industry is too widespread and its problems too diversified to be controlled by any bureau from a central point. The four points were:

Sound conservation laws in each state to prevent waste.

Fair and intelligent enforcement of such laws by the states.

Adherence by all states to an interstate compact.

That the industry ask Congress to adopt regulations to protect the buying public.

Harold Vance, head of the Texas A. and M. College petroleum engineering school, urged greater research in the oil industry with more scholastic training than now is given.

C. H. Row of San Antonio, and R. H. McClemore of Dallas, both with Sun Oil Co., reported that 33 new oil fields and 16 new gas fields had been discovered by wildcat drilling in southwest Texas in the past year.

Texas Asked to Hold To Present Allowable

(*Continued from page* 5)

ant savings of time for the executives.

President Charles F. Roeser of the Independent Petroleum Assn. of America and an independent producer in Texas, recommended to the commission that no change be made in the top allowables for the next 60 to 90 days, and that the two-day shutdowns be retained.

Questioned by Commissioner G. A. Sadler as to the ability of the industry to absorb the additional oil that would be produced by lifting the shutdowns, Roeser said:

Against Lifting Shutdowns

"The industry cannot stand lifting the shutdowns in Texas. We simply have too much oil produced on a nationwide basis. . . .

"We are seeing daylight despite the fact we have stocks 34 million barrels greater than at the same time in 1937, a period which found the oil industry in the best position it has enjoyed in years and years.

"We must perpetuate that stability we have built. I believe 98 per cent of the independent producers have the same viewpoint. If Texas leaves its top allowable as it is now, we will make fine progress. Don't fall for the presumption we can produce more oil than the consumers can use."

Asked if he thought refineries should be placed under control of the commission Roeser said he thought "a little control" would be all right since that was the one "unregulated" branch of the industry. He pointed out, however, that one way to assist the refiners was to restrict production to a figure comparable with that of the past three months.

Jake Hamon, president of the National Stripper Well Assn. also recommended no change in top allowables. He declined to express a definite opinion as to refinery control.

George A. Hill Jr., president of the Houston Oil Co. and a vice president of the American Petroleum Institute, said that it was indispensable that production in Texas be held for the next 60 to 90 days to a figure comparable with the present one. He told the commission that, in his opinion, it already had control over refineries through the medium of regulating production.

There was some dissenting opinions expressed regarding the retention of the shut-downs but it came mostly from operators in several pools who were desirous chiefly of obtaining adjustments in alleged inequalities as to allowables among pools. There seemed to be little objection to retention of the top allowable figure.

Stocks Too High

Testimony of Fred Van Covern of New York, head of the American Petroleum Institute's statistical department, tended to show that the refining industry had not held itself to the April 1 goal of 80,000,000 barrels of gasoline stocks which had been set up last fall as economically desirable. (Stocks on March 11 were nearly 86,000,000 barrels.) He said that it would be necessary for the industry to work off some 27 million barrels of gasoline during the summer if it is to enter next winter in a good position.

Van Covern said he saw nothing in the cards to call for a gain in crude oil production but that, if present levels were maintained for the next three months, in view of the present indications that a considerable reduction in gasoline stocks would occur this summer, the industry would be well on its way to reaching the necessary economic levels by Sept. 30.

Dr. Joseph E. Pogue of New York, vice president of the Chase National Bank, said he expected the demand for all oils in 1939 to be about 6.2 per cent higher than for 1938. He pointed out that, in the first quarter of 1939, however, gasoline stocks increased about 4 million barrels more than many would have liked to have seen, and that the problem now was to "unmake" that amount of gasoline between now and the end of the summer season. He said he believed the present crude allowable was ample to meet demands for the next three months or more.

Pointing to what he termed the "creep-up" in production as a result of new well completions Dr. Pogue said he doubted if Texas could lift the two-day shutdowns even in the third quarter of the year without upsetting the economic picture.

Dr. Alexander Sachs of New York in the course of his testimony corroborated the opinions previously given by both Van Covern and Dr. Pogue.

Three Executives Testify

The only executives who testified as to their company's statistical position were W. S. S. Rodgers of New York, president of The Texas Corp.; John G. Pew of the Sun Oil Co., and E. J. Henry, vice president of the Atlantic Refining Co.

Rodgers said he thought the industry could expect a gain of 3 to 4 per cent in motor fuel consumption this year.

Each of the three executives were asked by the commissioners if they were producing any oil in Louisiana; if they were bringing any of that oil to refineries in Texas, and how much oil they were producing all told and how much they were purchasing within Texas.

Rodgers said his company was producing 33,000 barrels of oil daily in Louisiana, 50,000 barrels daily in Texas, and buying an additional 78,000 barrels daily in the state. Pew said his company had about 800 barrels daily production in Louisiana, and that it buys in Texas about as much as it produces. Henry said Atlantic buys about 5000 barrels a day in Louisiana, and 75,000 barrels daily in Texas, in addition to producing 20,000 to 25,000 barrels daily in the state.

At the conclusion of Henry's testimony the commission ordered a 5-minute recess. Resuming the hearing Chairman Lon A. Smith announced that the remainder of the testimony would be filed with the reporter.

* * *

Report Cites Too High Runs At Refineries

AUSTIN, Texas, March 16.—The over-all statistical position of the oil industry has shown some improvement during January and February as compared with the same period a year ago but is not as favorable as two years ago.

Crude stocks east of California are about the same as last year and refinery products stocks have not increased as they did during the same period last year. Crude runs to stills, however, have been excessive, with the result that gasoline stocks, while below those of last year, still are too high by from five to seven million barrels, and normal recovery of the industry is being delayed.

These are conclusions of the quarterly report of the Committee on Supply and Demand of the Independent Petroleum Assn. of America, which was presented to that organization's executive committee in session here today.

Looking ahead for the second quarter of 1939 the committee reported that it believed gasoline demand should show a reasonable increase over the same period of 1938, although there had been a slowing down of general business activity in the early part of this year.

Gasoline stocks, however, should be reduced materially and, in order to avoid waste, should not exceed 70 million barrels on June 30, the committee reported. This reduction would place stocks about 10 million barrels under levels of the same time last year.

As one means of attaining this gasoline stocks level, the committee recommended that crude oil production for the area east of California be maintained during the second quarter at approximately the same daily average as for the first two months of 1939.

Notes Improvement

The committee noted some improvement in what it previously had stated were inequitable, unsound and unfair conditions existing in the industry, and said;

"In several previous reports we had stressed the fact that inequitable conditions had developed that were contrary to equitable proration of the production of crude petroleum in many of the oil producing states."

"We are glad to report at this time that through the co-operation of purchasing companies and regulatory bodies many of these conditions have been corrected. Other unsound situations are being worked on and we believe some of these will . . . . soon be corrected."

Unsound and inequitable conditions which still exist, the committee reported, include excessive production of oil in some states; lack of ratable takings in some areas; discrimination in purchases of crude between pools in some areas and continued drilling of unnecessary wells.

On the other hand the committee reported that much progress has been made in the past few months in obtaining a market for the full production of all stripper well pools.

Illinois Output Cited

Looking at the statistical position as of Feb. 28, the committee reported that, during January and February, crude oil production in Illinois was 54 per cent higher than the Bureau of Mines' estimate of market demand for that state's crude; was

11 per cent higher in Michigan and 8 per cent higher in Louisiana and 6 per cent higher in Arkansas. New Mexico's production was 2 per cent higher and Texas 0.3 per cent higher than the bureau's estimate.

States producing less than the bureau's estimates were: Oklahoma, 12.4 per cent; Wyoming, 21 per cent; Kansas, 2.6 per cent.

Stocks of crude east of California were 40 million barrels under the total at the same time last year, the greatest reductions being in Oklahoma, Texas and New Mexico.

Crude runs to stills during February were 43,000 barrels daily average higher than during the same month in 1938. The increase was mainly the result of increased runs in the Texas Gulf coast area and the Indiana-Illinois-Kentucky district.

Gasoline stocks Feb. 28 were 8 per cent under those for the same period last year, but still were too large, with indications now that stocks will exceed 86 million barrels on March 31. This would be 4 to 7 million barrels above economic levels, the committee stated.

Chemurgists to Hear Jacobs on 'Alky-Gas'

WASHINGTON, March 18. — P. Burke Jacobs, U. S. Department of Agriculture, will speak March 31 on "Motor Fuels from Farm Products" at the Fifth Annual Chemurgic Conference at Jackson, Miss., March 29 to April 1. Latest version of the Chemurgists' program indicates that Jacobs' speech is the only "alky-gas" speech scheduled for the Jackson meeting.

ALMA, Mich.—Midwest Refining Co.'s installation of a 1000-barrel Dubbs cracking unit and a "poly" plant is nearing completion.

16 Companies Cut Crude, Add to 'Gas' Stocks Since Dec. 31

(*Continued from page* 5)

sented here, it is found that 22 companies March 1 held 188,172,000 barrels of the crude oil in storage east of California. At the same time a year ago these same companies had 218,256,000 barrels in storage.

The companies had motor fuel stocks March 1 of 54,912,000 barrels, as compared with 63,007,000 barrels at the same date a year ago.

A study of the figures, however, shows further that the bulk of the crude stocks and the motor fuel stocks are in strong hands.

In the accompanying table No. 1 are shown the figures on crude oil as reported by the oil companies at the hearing here. It will be noted that well over 100 million barrels of crude is held by less than 10 large companies.

The statistical picture with reference to gasoline is shown in Table No. 2. Here again it will be seen that the bulk of the stocks are held by a relatively small number of large companies.

Sixteen major and semi-major companies were picked from the list of those filing information and their reported changes in both crude stocks and motor fuel stocks since last December are listed in Table No. 3. These 16 companies, taken as a whole, had a net reduction in crude stocks of 6,367,000 barrels during January and February this year, while they added a net of 1,730,000 barrels of motor fuel to stocks in the three months from Dec. 1 to March 1.

In studying the tables it might be well to review briefly the 11 questions the commission sent to the executives:

1. What are your present stocks of gasoline in all forms, finished and unfinished?

2. How does this compare with a year ago?

3. What has been your change in gasoline stocks since Dec. 1, 1938?

4. What is your present crude inventory?

5. What change, if any, has there been in your crude stocks since 1938?

6. Do you contemplate withdrawal of stocks between now and May 1, 1939, and if so, how much of both motor fuel and crude oil?

7. What were your gasoline stocks as of March 31, 1938?

8. What were your crude stocks as of March 31, 1938?

9. What do you expect your gasoline inventory to be March 31, 1939?

10. What do you expect your crude inventory to be March 31, 1939?

11. What will be your policy with reference to inventories from now until May 1, 1939?

Oil Hearing Boosts Austin Airport Traffic

AUSTIN, Tex., March 15.—The statewide proration hearing by the Texas Railroad Commission here today caused the Austin airport to have on hand for the day one of the largest number of airplanes in its history.

Many of the executives who attended the hearing arrived in company planes. In addition, four extra planes were required to haul the passengers on the commercial line from Dallas and Fort Worth.

Ashland Buys Gathering Lines

ASHLAND, Ky.—Ashland Oil & Refining Co. has purchased from Illinois Pipe Line Co. 300 miles of gathering lines serving approximately 2500 small wells in western Kentucky, including a barge terminal at Owensboro.

TABLE NO. 1—Crude Stocks Reported by Oil Companies Filing Data with The Texas Railroad Commission at March 15 Hearing

(Number above each column corresponds to number of question asked by the commission.)
(Figures in thousands of barrels)

	(4) Stocks Held 3-1-39	(5) Change Since 12-31-38	(8) Stocks Held 3-31-38	(10) Estimated Stocks 3-31-39	(11) Policy to 5-1-39
The Texas Corp.	25,984	+1,364	24,546	26,717	*.....
The Sun Oil Co.	5,992	+295	6,027	6,062	.....
Atlantic Refg. Co.	4,764	—2,296	7,120	4,975	+121
Skelly Oil Co.	607	+ 16	739	620	†.....
Continental Oil Co.	8,665	—433	9,098	8,714	.....
Gulf Oil Corp.	14,250	—383	16,862	.....	.....
S. O. of Indiana	36,586	—753	44,462	36,190	—800
Socony-Vacuum-Magnolia	25,500	—1,859	31,581	24,376	—1,765
Humble O. & R. Co.	12,030	—729	13,166	12,055	—191
Shell Petroleum Corp.	6,586	+848	10,000	6,800	+100
Cities Service Oil Co.	7,712	—362	12,101	7,500	.....
Barnsdall Refg. Co.	177	— 11	.....	177	—177
Barnsdall Oil Co.	439	+116	1,037	325	—100
Ohio Oil Co.	10,464	—422	10,809	10,464	.....
Pan-American P. & T. Co.	2,940	— 93	3,065	2,976	.....
Republic Refg. Co.	1,007	+280	940	995	.....
Eastern States Pet. Co.	165	—167	148	50	†.....
Taylor Refg. Co.	253	+100	32	200	.....
Tide-Water Associated	4,587	+ 17	5,028	4 808	.....
Pure Oil Co.	3,671	— 36	4,034	3,600	— 60
S. O. of New Jersey	15,793	—1,541	17,452	15,123	—828

*Will remain about the same.
†Moderate reduction anticipated.

TABLE NO. 2—Gasoline Stocks of the Oil Companies Supplying Data to Texas Railroad Commission at Hearing, March 15

(Number above each column corresponds to number of the question asked by the commission.)

(Figures in thousands of barrels)

	(1) Stocks 3-1-39	(2) Change from Yr. Ago	(3) Change Since 12-1-38	(7) Stocks 3-31-38	(9) Estima'd Stocks 3-31-39	(11) Invent'y Change to 5-1-39
The Texas Corp.	8,133	—714	—1,965	9,222	8,111	— 78
Sun Oil Co.	2,987	+ 48	+508	3,168	3,049	+ 97
Atlantic Refg. Co.	1,698	—281	+ 43	2,200	1.911	.....
Skelly Oil Co.	759	— 5	—242	731	750	*.....
Continental Oil Co.	1,964	+262	+390	1,701	1,935	.....
Gulf Oil Corp.	5,141	+797	—324	6,095	5,523	*.....
S. O. of Indiana	5,885	—778	+942	6,298	5,841	*.....
Socony-Vac.-Magnolia	6,356	—1,986	+903	8,777	7,031	+701
Humble O. & R. Co.	1,994	—1,076	—164	2,278	1,907	—200
Shell Petroleum Corp.	5,265	—631	+526	6,052	5,634	+400
Cities Service Oil Co.	1,753	—647	—154	2,609	1,850	.....
Barnsdall Refg. Co.	236	+ 3	+ 36	244	143	—167
Ohio Oil Co.	534	+ 40	+132	539	542	— 50
Pan-American P. & T. Co.	2,850	+660	+600	2,104	2,800	*.....
Republic Refg. Co.	660	+298	+134	453	650	.....
Eastern States Pet. Co.	317	+ 90	+158	108	100	*.....
Taylor Refg. Co.	278	+257	+ 7	18	250	*.....
S. O. of New Jersey	4,775	—1,367	—359	6,493	5,544	.....
Tide-Water Associated	1,478	— 23	+366	1,521	1,526	.....
Pure Oil Co.	2,159	—456	+528	2,401	2,291	.....

*Moderate cut anticipated.

TABLE NO. 3—Change in Stocks of Crude Oil and Gasoline Held by 16 Major and Semi-Major Companies Since Last December, as Reported at March 15 Hearing

(Figures in thousands of barrels)

	CRUDE Change Since Dec. 31, 1938		GASOLINE Change Since Dec. 1,1938	
	Inc.	Dec.	Inc.	Dec.
The Texas Corp.	1,364	.....	.....	1,965
Sun Oil Co.	295	.....	508	.....
Atlantic Refg. Co.	.....	2,296	43	.....
Skelly Oil Co.	16	.....	.....	242
Continental Oil Co.	.....	433	390	.....
Gulf Oil Corp.	.....	383	.....	324
S. O. of Indiana	.....	753	942	.....
Socony-Vac.-Magnolia	.....	1,859	903	.....
Humble Refg. Co.	.....	729	.....	164
Shell Petroleum Corp.	848	.....	526	.....
Cities Service Oil Co.	.....	362	.....	154
Ohio Oil Co.	.....	422	132	.....
Pan-American P. & T. Co.	.....	93	600	.....
S. O. of New Jersey	.....	1,541	.....	359
Tide-Water Associated	17	.....	366	.....
Pure Oil Co.	.....	36	528	.....
Totals	2,540	8,907	4,938	3,208
Net Change	.....	—6,367	+1,730	.....

Compact Body Told 3000-4000 Wells Will Be Drilled in Illinois in '39

AUSTIN, Texas, March 16.—The Interstate Oil Compact Commission's members agreed at their quarterly meeting here March 16 to shake off their reticence to talk right out loud about their tasks and accomplishments. Hereafter the public will have an opportunity to know all there is to know about the compact and its functions.

This decision was reached after Chairman Ernest O. Thompson, representing Texas, had outlined two developments.

One was the threat of federal legislation, as recommended in the natural resources committee's report to set up a federal agency to draft "standards" for production of petroleum.

The other was criticism Thompson said had developed in certain quarters that the compact was a "do nothing committee."

"We have been going about too quietly," Thompson declared, "because Congress has been given a recommendation by some individuals who apparently are not aware of the fact the industry has had 'standards' under the compact for the past four years. Those minimum standards were embodied in the heart of the compact itself."

Having agreed that henceforth the compact's delegates will cease to be, as Thompson phrased it, "blushing violets," they unanimously adopted a resolution to have a committee named to draft more comprehensive standards for production and conservation to be administered within the framework of state sovereignty.

The committee, of which Thompson was named chairman, will have the authority to set up a technical staff to assist it in its work.

Stated briefly, the compact commission is going to launch some public relations work. In the words of Thompson; "Somebody has started a prairie fire, and it is time we were starting a little back-firing."

Start Public Relations Work

Thompson was authorized to appoint his committee, get it to functioning, and to report when the commission holds its June meeting at Santa Fe, N. M. The delegates previously had accepted the invitation of Gov. John E. Miles of New Mexico to meet in that city.

Each member state was represented at the meeting here of the compact commission, although as a result of recent changes in administrations in some of the states there were several new faces.

Chairman A. F. Schoeppel of the Kansas Corporation Commission and Conservation Officer T. A. Morgan represented Kansas; Charles Orr was the Oklahoma representative and E. J. Coyle and State Geologist A. H. Bell represented Illinois.

Hiram Dow was present again as New Mexico's representative while Warwick Downing again represented Colorado, and Col. Thompson, of course, represented Texas.

Arkansas had an official observer in Chairman O. C. Bailey of the Arkansas Conservation Commission. California's observer was Edward Pauley while Louisiana's governor sent M. Dunbar. Parker E. Melvin was an observer from Pennsylvania.

Secretary Art Walker of the commission announced that the states represented at the meeting were producing currently 93.86 per cent of the total output in the U. S.

Several speakers discussed before the commission the oil industry's current position and the trends for the coming year.

Russell Brown, of Washington, vice president of the Independent Petroleum Assn. of America presented to the commission the report of that organization's committee on supply and demand, in which it was suggested that motor fuel stocks, now standing at approximately 85 million barrels, should be reduced at least 15 million barrels within the next three months.

State Geologist Bell of Illinois brought the audience right up to the front row seats when he started giving some current figures on that state's oil production.

Report Illinois' Growth

Dr. Bell said that, on last Sept. 20, there were 1108 wells in the new fields of Illinois, whereas on Feb. 28 there were 2600 new wells. He said the daily average production at that date was 163,000 barrels, or an average of 56 barrels per well. There were discovered during February, Dr. Bell said, four new fields within the state.

The rapidity with which Illinois swung into the production picture was shown by Bell's statement that total output in 1938 was 23,929,000 barrels, almost three times as much as the total of 7,500,000 barrels in 1937.

Dr. Bell said he expected between 3000 and 4000 new wells to be drilled in 1939, basing his estimate on the number of completions by months for December, January and February. He said there were 452 completions last December, but bad weather cut the total down to 239 in January and to 243 in February.

The commission and the audience showed considerable interest in Bell's statement that the new fields probably would have about the same performance curve as did the old fields. This would mean, he said, that two thirds of the production would be obtained in the first third of the life of the new fields. He also said that, if no new fields are discovered later in the year, he anticipated the state would reach its peak production late in 1939.

A prediction that, unless the oil industry keeps to itself a democratic form of control which allows operation by conciliation and accord, it will get another kind of control, was expressed by Axtell J. Byles of New York, president of the American Petroleum Institute.

The country is too big, Byles said, for central bureaucratic control.

Praises Commission's Work

Byles paid high compliment to the compact commission for its accomplishments and expressed hope for further achievements. "There is no proper conservation of oil without proper well spacing," Byles said. "The only waste is the waste of reservoir energy. We should have the cooperation of the industry with the state governments and cooperation by the states. The tragedy is that all oil producing states are not members of the compact.

Blame for the excess production of gasoline was placed by Byles on the inability of refiners to know or attempt to learn what their competitors are doing. He praised the efforts of the Texas Railroad Commission at its last two proration hearings by stating that it was the first time that the industry has obtained a detailed picture of motor fuel stocks. He recommended strongly the revival of voluntary agreements in business.

Dr. A. G. White of Washington, chief petroleum economist for the Bureau of Mines, outlined briefly the statistical position of the industry. He said that it appeared now that motor fuel and crude oil demand for the first quarter would be higher than had been anticipated and that the outlook for the second quarter was good, with an increase in domestic demand some 5.5 to 6 per cent above the demand for the same period a year ago. He also stated, in reply to a question by Chairman Thompson, that gasoline stocks probably would have to be reduced by some 20 million barrels between now and Sept. 30 for the industry to go into the winter months in a sound statistical position.

Participation Extended

Delegate Downing reported to the commission that he had an executive order recently signed by Colorado's governor extending that state's participation in the compact for another two years.

Delegate Dow reported the New Mexico legislature had approved the compact for another two years.

Bailey of Arkansas reported efforts to get Arkansas into the compact had failed due to a filibuster in the legislature just before adjournment which prevented introduction of the resolution. It was believed, however, that Gov. Carl E. Bailey was contemplating the issuance of an executive order permitting the state's participation pending another session of the legislature.

Chairman Thompson lost no time in getting under way with the "public relations" work. At a roundtable discussion following the regular session the talk turned to the present European situation. The delegates agreed that the oil industry easily and immediately could supply the additional 800,000 barrels of crude daily which it had been estimated would be required for national defense or armed conflict.

Turning to reporters Thompson said; "The oil producing industry here represented reports 'ready for any emergency.' Here is one basic industry so necessary to national defense that needs no urge or further organization or control to answer and fulfill ever demand that could possibly be made upon it in any eventuality."

'Safety' Fuel Better for Planes Than Diesel, Engineers are Told

By ARCH L. FOSTER
NPN Technical Editor

WASHINGTON, March 17.—Operation of aviation engines on safety fuels by the use of positive fuel injection systems, instead of by the conventional carburetor intake mechanism, appears to offer more immediate possibilities for air safety than does the use of the heavy-oil or diesel-type engine, F. C. Mock, Bendix Aviation Corp. engineer, told 200 members of the aviation activities of the Society of Automotive Engineers here.

Pumps and accessories needed for operating on these fuels are available to the aircraft industry, and the responsibility for completing the job of perfecting a power plant, using safety fuels with direct injection, rests on the shoulders of the engine designers, Mock believes.

A considerably higher fuel economy with high power output can be obtained with aircraft engines by use of higher compression ratios, optimum spark advance provisions and a higher mechanical efficiency in these engines, according to a paper by D. S. Hersey, Pratt & Whitney Aircraft Corp. engineer declared. Reduction of temperatures at which engines operate is one of the main considerations, Hersey continued. Using 100-octane number fuel and 145 pounds compression pressure, a compression ratio of eight to one can easily be used, he said. Detonation is one of the primary limiting factors, but can be controlled in great measure by controlled spark advance, preferably automatic.

High-Flash Fuels Ready

Fuel refiners have done their share in providing high flash-point safety fuels, according to Mock, and these fuels are available when the engine-fuel systems are perfected. Some years ago a safety fuel was provided which had a flash point of 105° F. and a distillation range between 300° and 475° F., rating about 87 octane number; study of this fuel and design of engines for it were halted when interest in lighter-than-air craft waned, and until recently little has been done.

At least four years will be required for an engine company to complete the design, manufacture and test of an engine and fuel system suitable for these high flash fuels, Mock said. The fuel injection system would weigh and cost 2½ times as much as our present carburetor system, it was shown, but some of the advantages derived would doubtless more than offset this extra weight and cost.

The fuel economy would be dependent on the heat value of the fuel; in pounds per horsepower this would be lower for the safety fuel since its calorific value is less than that of regular aviation fuel. However, discussion brought out, from a commercial viewpoint the horsepower *per gallon* might be equal to or greater than that of regular fuel because of the greater weight per gallon of the safety fuel made from petroleum, which is as much as 15 per cent more weight per gallon.

One of the drawbacks to these high-flash safety fuels may prove to be an advantage when actual practice is established, it was indicated in these discussions. Vaporization of these fuels offers a problem in cold starting. Auxiliary, more volatile fuels may be used for starting and warming the engine, which necessitates additional separate tanks; or special means may be employed to obtain the heat necessary to vaporize the injected fuel, it was pointed out. Once the engine is hot, a great problem has been to cool the large diameter pistons in modern engines; cylinder and valve cooling are also major problems at high power output rates.

By injecting the high-flash fuel directly or partly against hot pistons and valves, vaporization may be obtained at the same time these parts are cooled. Still larger pistons and valves may be used Mock said, if fuel injection is used for cooling which he believes would permit as high power output from 18 cylinders as we now obtain from 24 cylinder engines. By fuel injection the completeness of combustion may be improved, improving fuel economy further. At the same time the air-fuel ratio may be kept more exactly where the operator wishes, since the pump would measure out exactly the same quantity of fuel each time to each cylinder.

Automotive Injection Pumps

The customer who so wishes may now have a gasoline engine with fuel injection, one speaker pointed out. The new Continental engine (automotive) is fitted with injection pump instead of a carburetor, the increase in cost being only $10.

The Germans are now using gasoline injection in aviation and other engines with excellent fuel economy and little mechanical difficulty, it was brought out on the floor of the meeting. This development is ascribed to two causes by American engineers—the greater variation in fuel specifications available in Germany, and the highly mechanical nature of the German carburetor. German engineers do not apply the laws of hydraulics in designing carburetors, speakers said. It is a purely mechanical device, and therefore its performance is affected by variations in volatility and other fuel properties. When a problem arises in carburetion, the German simply adds another jet, it is said. German engineers also have a wide experience in diesel fuel injection, from which to draw in using gasoline injection systems.

Use of injection systems therefore would simplify some aviation engine problems, while introducing others, the consensus of this meeting indicated. Octane number needs would be lowered by injection, or, correspondingly, engine efficiency with a given octane number would permit slightly higher compression pressures, because of greater uniformity in air-fuel ratio in each cylinder under all conditions. Detonation would tend to minimize somewhat as a result of cooling hot spots in the engine by the fuel when injected, and slightly higher fuel economy would be obtained. However, these advantages can be gained only by perfecting the injection system, which will require some time yet, it was stated.

Engine and Fuel System Designed To Improve Efficiency and Power

Multi-speed superchargers, with ample intercooling of fuel-air mixture before introduction into the cylinders, will improve the efficiency of the present aviation engine using present fuels, Hersey declared. An engine designed for maximum economy should develop its maximum cruising power without supercharging, and the supercharger should be used for obtaining maximum take-off and climbing power.

Hersey's expression that "Ideal economics would already be obtained in the Otto-cycle (gasoline) engine if a suitable non-detonating gasoline were available" was not made too clear. He may have been referring to extremely high octane numbers, beyond the range that has been produced commercially so far. It is known that with the new, narrow-boiling range blending materials, such as iso-octanes and iso-heptanes, a problem is found in meeting distillation range specifications for fuels such as have become conventional in past years. Serious attention has been paid to this problem, and work is continuing to clarify the difficulty.

Under ideal conditions a 10:1 compression ratio engine will show a brake specific fuel consumption of 0.332 pounds per hp.-hour, Hersey said. This is an improvement of about 22% over a 6.5:1 compression ratio; the peak cylinder pressures would increase about 60% under the higher ratio conditions, necessitating increase in engine weight. Under reduced power cruising conditions an 8:1 compression ratio engine would operate at 0.365 pounds per bhp. hr., at sea level, and at 0.38 pounds at 15,000 feet elevation.

Experience has shown that of all factors which can be improved, the reduction of fuel charge and cylinder operating temperatures, and the use of excess air—via the supercharger—are the most important in improving engine efficiency without detonation, Hersey has found. Very lean mixtures of up to 25:1 have been employed in experimental operation, which require spark advances of up to 50 degrees of crank angle to burn them properly. By greatly reducing cylinder temperatures, an increase in compression pressures up to 40 pounds per square inch have been obtained, which will increase power output remarkably without serious mechanical or operating difficulties, he said.

Fred Deering Recovering

TULSA — Fred Deering of Kanotex Refining Co., operated on for appendicitis two weeks ago, is expected to be released from the hospital in a few days.

April 'Gas' Demand Will be 7% Higher

N. P. N. News Bureau

WASHINGTON, March 20. — The year 1939 has started out, and is predicted to continue, as the best gasoline demand year of all time.

Federal gasoline tax collection figures indicate a 10 per cent gain during the first two months this year over a similar period in 1938. Bureau of Mines forecast a "slight" increase (NPN, March 1, page 22) in March demand over March a year ago, and, the latest indication is the Bureau's forecast of a 7 per cent gain for April.

For April, the Bureau forecasts domestic motor fuel demand at 46,300,000 barrels, as compared with 43,254,000 barrels in April, 1938.

If this is realized, the first four months of 1939 will be the highest in history.

In explaining the April demand, the Bureau says, "Although a part of this expected increase can be attributed to a slightly subnormal demand a year ago, the principal cause rests in improved business conditions combined with the upward trend in motor fuel demand per motor vehicle."

Motor fuel exports for April have been estimated as 4,300,000 barrels, which is slightly less than exports of April a year ago.

However, despite these predicted increases in demand, the Bureau forecasts a daily average supply of domestic crude oil of 3,434,000 barrels, which is 3 per cent more than the March estimate and almost one per cent less than the actual demand in April last year. Estimated daily runs to stills are 81,500 barrels higher than the actual for a year ago. This, according to the Bureau is primarily because the estimates for crude oil exports and fuel and losses for April are much lower than a year ago.

The Bureau, quoting American Petroleum Institute statistics, estimates stocks of finished and unfinished gasoline at 87,000,000 barrels at the end of February, and forecasts a reduction of 2,800,000 barrels for April.

Benzol and direct sales and losses of gasoline for April have been estimated as 1,100,000 barrels making refinery production 46,700,000 barrels, which is distributed among the various districts as follows:

District	Barrels
East Coast	6,120,000
Appalachian	1,670,000
Indiana-Illinois	8,550,000
Oklahoma	2,820,000
Kansas-Missouri	2,270,000
Texas Inland	3,320,000
Texas Gulf Coast	12,200,000
Louisiana Gulf Coast	1,420,000
North Louisiana-Arkansas	920,000
Rocky Mountain	1,220,000
California	6,190,000
Total U. S.	46,700,000

Because natural gasoline consumption at refineries is estimated at 2,940,000 barrels in April and the yield of straight run and cracked gasoline is estimated as 44.6 per cent, it is estimated that crude runs will amount to 98,120,000 barrels or 3,270,000 barrels daily. Foreign crude runs are estimated at 2,200,000 barrels. This makes the total demand 103,020,000 barrels, or 3,434,000 barrels daily.

Estimated Daily Average Crude Oil Demand by States For April as Calculated by U. S. Bureau of Mines

(As no changes in crude oil stocks are involved in these estimates, they represent demand rather than production)

State	Forecast April 1939	Forecast March 1939	Actual demand April 1938
Texas	1,412,700	1,363,900	1,391,000
California	592,000	588,400	702,000
Oklahoma	473,300	473,200	527,000
Louisiana	262,000	259,700	266,000
Kansas	152,700	150,300	173,000
Illinois	149,300	125,500	34,000
New Mexico	115,300	109,700	85,000
Arkansas	53,300	50,000	54,000
Wyoming	50,000	53,600	61,000
Michigan	48,300	47,700	54,000
Pennsylvania	48,000	45,100	47,000
Kentucky	17,700	17,700	12,000
Montana	15,300	13,500	13,000
New York	15,100	14,800	14,000
Ohio	10,900	9,800	9,000
West Virginia	10,100	10,000	10,000
Colorado	5,000	4,200	4,000
Indiana	3,000	2,900	2,000
Total U. S.	3,434,000	3,340,000	3,458,000

Federal 'Gas' and Lube Oil Tax Collections Are Running 10% Ahead of 1938

N. P. N. News Bureau

WASHINGTON, March 20.—Federal gasoline tax collections for January and February were up almost 10 per cent above collections for the corresponding two months of 1938, Internal Revenue Bureau reports.

Possibly even more encouraging from a general business standpoint—since lubricating oil sales may be regarded as somewhat of an index of industrial activity—is the fact that federal receipts from the tax on lubricating oils for the first two months of 1939 were over 10 per cent above the same period last year.

Receipts from the tax on transportation by pipeline also were considerably above the two-month period of 1938. Figures for February and the first two months follow, in tabular form:

	1938		1939	
	Feb.	Jan.-Feb.	Feb.	Jan.-Feb.
Gasoline	$13,541,200	$29,971,073	$16,427,083	$32,958,974
Lube Oils	1,715,439	3,914,459	2,129,469	4,340,765
Pipelines	1,094,979	1,887,319	1,092,782	2,137,149

'Gas' Stocks Climb 30% in Four Months

N. P. N. News Bureau

NEW YORK, March 21.—Another substantial increase in gasoline stocks—941,000 barrels—was reported by the American Petroleum Institute today in its survey of refinery operations for the week ended March 18.

The Institute in its report today also revised upward its estimate of the country's gasoline stocks as of March 11 from 85,966,000 barrels to 86,350,000 barrels.

Refinery crude runs last week increased 45,000 barrels to 3,250,000 barrels daily. Gasoline production at plants reporting this item to the Institute was up only 11,000 barrels. Gas and fuel oil stocks declined 275,000 barrels.

Contrasted with the jump of 941,000 barrels in gasoline inventories last week is the increase of only 19,000 barrels in the comparable seven-day period of 1938. Inventories March 18, however, totaled 87,291,000 barrels, 5,012,000 barrels under the inventories of 92,303,000 barrels reported for the same 1938 date.

Since the most recent low point in gasoline stocks was reached—67,551,000 barrels on Nov. 12, 1938—inventories have climbed 19,291,000 barrels on March 18, or approximately 30 per cent.

The largest volume increase during the same period has been in the Indiana-Illinois-Kentucky district—5,409,000 barrels, or approximately 53 per cent. An increase of 832,000 barrels in the Rocky Mountain district represented a jump of 77 per cent in that district.

As compared with the U. S. total increase of 30 per cent, inventories in other districts have increased as follows: Oklahoma-Kansas-Missouri, 32 per cent; Louisiana-Gulf, 31 per cent; East Coast, 25 per cent; Inland Texas, 21 per cent; Appalachian, 21 per cent; California, 20 per cent; Texas Gulf, 17 per cent; and North Louisiana-Arkansas, 7 per cent.

Lion's Earnings Nearly Up To '37

CLEVELAND, March 21. — Lion Oil Refining Co.'s program to increase its crude reserves was continued last year, Col. T. H. Barton, president, reported in the company's 1938 financial statement, and at the close of the year the company's daily crude oil production was about equal to daily refinery requirements.

New fields are predicted to be found soon in South Arkansas close to the company's refinery.

Net income, after all charges, last year was $912,483 or $2.10 a share, against $945,335, or $2.17 a share, in 1937. An increase of 18 per cent was made last year in refinery tank car sales, and the report states "our lubricating oil sales, in particular, have shown a steady growth."

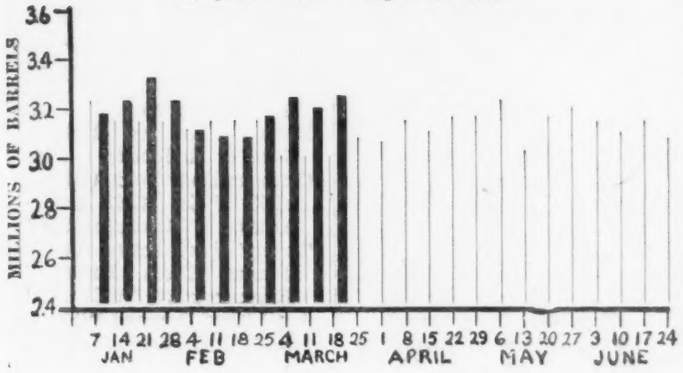
A number of new service stations were built last year by the company, some older stations were modernized, and additional outlets purchased. A new cracking and reforming unit, it was announced, will be in operation by July 1.

Lion Oil published its annual report in illustrated pamphlet form, with sales and production charts, photographs of a company station and bulk plant, and a picture of the refinery on the front cover. The printing is in red and black.

Latest Oil Industry Statistics

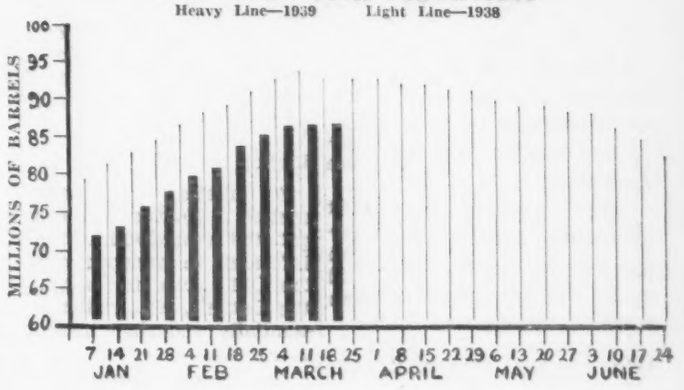
Daily Average Crude Runs to Stills

Heavy Line—1939 Light Line—1938



Total U. S. Motor Fuel Stocks

Heavy Line—1939 Light Line—1938



A. P. I. Weekly Refinery Report

(Figures in Thousands of Barrels of 42 Gallons Each)

Districts	Per Cent Capacity	Daily Average Crude to Stills (Barrels) Week Ended		Per Cent of Reporting Capacity Operated Week Ended		(a) Gasoline Production Week Ended		Stocks (Thousands of Barrels) Total Finished and Unfinished Motor Fuel(b) Week Ended		Stocks of Gas and Fuel Oil — Gas Oil and Distillates Week Ended		Residual Fuel Oil Week Ended		Total Week Ended	
		Mar. 18	Mar. 11	Mar. 18	Mar. 11	Mar. 18	Mar. 11	Mar. 18	Mar. 11	Mar. 18	Mar. 11	Mar. 18	Mar. 11	Mar. 18	Mar. 11
East Coast	100.0	495	510	80.5	82.9	1,535	1,382	21,098	20,560	3,207	3,535	4,524	4,628	7,731	8,163
Appalachian	85.9	108	105	84.4	82.0	374	372	3,462	3,339	227	220	515	515	742	735
Ind., Ill., Ky.	89.5	463	458	90.1	89.1	1,873	1,892	15,654	(e)15,220	2,248	2,373	2,965	3,032	5,213	5,405
Okla., Kans., Mo.	81.6	238	232	69.6	67.8	(e)801	(e)841	8,029	8,039	1,089	1,111	2,908	2,926	3,997	4,037
Inland Texas	50.3	123	108	77.4	67.9	494	448	1,996	1,960	270	274	1,539	1,521	1,809	1,795
Texas Gulf	89.5	775	795	86.6	88.8	2,520	2,493	11,050	11,217	2,477	2,606	4,516	4,333	6,993	6,939
La. Gulf	97.3	116	120	80.0	82.8	313	302	2,594	2,544	680	707	712	667	1,392	1,374
No. La., Ark.	55.0	39	38	70.9	69.1	98	106	502	517	249	242	528	547	777	789
Rocky Mt.	54.2	42	36	65.6	56.3	236	215	1,907	1,854	143	149	584	578	727	727
California	90.0	505	453	67.8	60.8	1,407	1,614	15,819	15,928	10,540	10,519	87,490	87,202	98,030	97,712
Total Reporting	85.8	2,904	2,855	79.3	78.0	9,654	9,665	82,111	(e)81,210	21,130	21,727	106,281	105,949	127,411	127,876
U. S. Total (d)		3,250	3,205					87,291	(e)86,350	21,710	22,322	108,661	108,324	130,371	130,646
U. S. Total, 3-18-38(d)		3,093						92,303		19,303		102,287		121,590	

(a) Includes straight-run, cracked and natural blended.
(b) Includes stocks at refineries, in bulk-terminals, pipe lines and in transit.
(c) 12% of reporting capacity in this district did not report gasoline production.
(d) Estimated, U. S. Bureau of Mines basis. (e) Revised.

Trends of Basic Figures

	March 18	March 11	Mar. 18, '38
Crude Production (*Bbls. daily*)	3,384,150	3,353,000	3,433,550
Crude Imports (*Bbls. daily*)	73,860	56,860	75,860
Crude Runs to Stills (*Bbls. daily*)	3,250,000	3,205,000	3,093,000
Gasoline Stocks (*Bbls. total*)	87,291,000	85,966,000	*86,350,000
Gas and Fuel Oil Stocks (*Bbls. total*)	130,371,000	130,646,000	121,590,000

*Revised from 85,966,000 bbls.

Daily Average Crude Oil Production for the U. S.

(American Petroleum Institute figures)

	Week Ended Mar. 18 Barrels	Mar. 11 Barrels	Mar. 4 Barrels
Oklahoma City	117,800	115,590	110,350
Total Oklahoma	446,500	446,300	441,200
Kansas	161,150	139,000	144,900
East Texas	372,850	372,800	372,650
Total Texas	1,319,700	1,319,150	1,321,050
Total Louisiana	263,050	264,950	266,650
Illinois	168,200	165,250	158,050
California	640,100	628,200	609,300
East of Rockies	2,744,050	2,724,800	2,705,550
Total U. S.	3,384,150	3,353,000	3,314,850
Crude Imports	73,860	56,857	44,125
Total New Supply	3,458,010	3,409,857	3,358,975

Inventories, Feb. 28, 1939, of Pennsylvania Lube Oils

(Compiled by National Petroleum Ass'n from reports of all companies which refine Pennsylvania crude oil. Figures in barrels.)

Raw Long Residuum (Including all raw long residuum below, and not salable, as 600 fire)	19,725
Steam Refined (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	239,316
Other Steam Refined (Not included in above items)	135,597
Finished Dewaxed Long Residuum	62,337
Bright Stock (Does not include any material reported in Finished Dewaxed Long Res.)	406,126
Viscous Neutral, below 180 vis. but not below 142 vis. at 100	128,414
Viscous Neutral, 180 vis. at 100 and above	192,205

Inventories, Feb. 28, 1939, of Pennsylvania Oils Other Than Lubricating Oils

(Compiled by National Petroleum Ass'n from reports of oil region refiners. Figures in barrels.)

Naphthas and Gasolines	
(1) Straight run, unblended and/or unleaded, for sale as motor fuel	37,491
(2) Naphtha and gasoline, for sale for blending or further refining, or held at refinery for further distillation, reforming, blending or leading	350,673
(3) Below 65 octane, not included in (1) or (2) above	31,889
(4) 65 Octane and above	404,068
Salable naphthas other than motor fuel material (do not include refinery process naphthas)	37,459
Kerosine	81,078
36-40 gas oil (include furnace oil)	45,391
Fuel oil (not reported above)	24,550
Oils held as cracking plant charging stocks	256,639
Non viscous neutral	17,470
Wax distillate	117,122
Crude petroleum	12,573
Wax (lbs.)	3,729,878

Sohio Acquires Production In Kentucky and Michigan

N. P. N. News Bureau

CLEVELAND, March 21.—Standard Oil Co. of Ohio's 1938 financial report brings out the steps this company is taking to make itself a truly integrated oil company, fortified by crude oil production, which until recent years it has had to secure entirely from outside sources.

The company now has about 1000 barrels daily of net production in Kentucky and Michigan and a reserve under wells drilled thus far of "something less than a million barrels."

Its purchases of crude oil in Illinois in 1938, through its subsidiary, Sohio Corporation, together with purchases in Kentucky, Michigan and Ohio, made this company a very limited buyer of crude in the Oklahoma fields, from which it formerly secured the major part of its refinery requirements.

Standard of Ohio's report showed it bought acreage in the Birk City field in Kentucky and also in Michigan particularly in the new Freeman field.

Substantial increase in volume of business in 1938 was reported by the company, although its gross income was slightly less due to the decline in prices in all products in 1938. Gallonage sales were the largest in the company's history, being nine per cent above 1937. Net profit of $1,964,605 for 1938 was about 58 per cent of net profit of $3,362,960 in 1937.

Buying Into Gathering System

An interest in a gathering system in Kentucky is being negotiated now, stockholders were informed, to transport crude to the Ohio river for barging to the Latonia, Ky., refinery, substantially reducing transportation costs.

Company refineries last year increased crude runs about 8 per cent over 1937, to about 16,000,000 barrels. A slight increase in operating expense was reported, although the cost per barrel was not higher. The report shows an addition during the year of 685,000 barrels storage capacity but no new refining capacity was added.

The company's earned surplus of $14,337,407 on Jan. 1, 1938, was increased by $645,300 to $14,982,707 on Dec. 31, 1938. Net working capital at the end of 1938 was $13,719,805 against $10,625,869 in 1937.

Coming Meetings

American Chemical Society, Baltimore, Md., April 3-7.
American Petroleum Institute, Division of Production, Eastern District, William Penn Hotel, Pittsburgh, Pa., April 4, 5.
American Petroleum Institute, Division of Production, Pacific Coast Section, Hotel Biltmore, Los Angeles, April 11.
Michigan Petroleum Assn., 5th annual meeting, Detroit-Leland Hotel, Detroit, Mich., April 11, 12.
National Petroleum Assn., 36th semi-annual meeting, Hotel Cleveland, Cleveland, O., April 13, 14.
Fuel Oil Distributors Assn. of New Jersey, Asbury Park, N. J., April 13, 14.
American Petroleum Institute, Division of Production, Mid-Continent District, Skirvin Hotel, Oklahoma City, Okla., April 18, 19.
Oil Burner Institute, Hotel New Yorker, New York City, April 18.
Oil-World Exposition, Houston, Tex., April 24 to 29.
American Institute of Mining & Metallurgical Engineers, Open Hearth Conference, Cleveland, April 26, 27, 28.
Petroleum Electric Supply Assn. and Petroleum Industry Electrical Assn., Rice Hotel, Houston, Tex., May 2-4.
Natural Gasoline Assn. of America, Hotel Tulsa, Tulsa, May 3-5.
American Institute of Chemical Engineers, Akron, O., May 9-11.
Virginia Oil Men's Assn., annual spring meeting, John Marshall Hotel, Richmond, May 11, 12.
National Battery Manufacturers Assn., Greenbrier Inn, White Sulphur Springs, W. Va., May 11, 12.
American Petroleum Institute, 9th mid-year meeting, Roosevelt Hotel, New Orleans, La., May 15 to 18.
National Oil Scouts Assn., Houston, Tex., tentative dates May 18-20.
National Assn. of Purchasing Agents (Oil Company Buyers' Group), annual meeting, Fairmont Hotel, San Francisco, Calif., May 21 to 25.
World Automotive Engineering Congress, sponsored by S.A.E. for New York, Hotel Pennsylvania, May 22-28; Indianapolis, May 29, 30; Detroit, Hotel Statler, May 31-June 2; San Francisco, Hotel Fairmont, June 6-8.
Illinois-Indiana Petroleum Assn., annual meeting, Robinson, Ill., June 3.
Pennsylvania Grade Crude Oil Assn., annual meeting, Hotel Hershey, Hershey, Pa., June 15, 16.
13th International Congress of Carbide, Acetylene, Oxy-Acetylene Welding & Allied Industries, Munich, Germany, June 25 to July 1.
American Society for Testing Materials, 42nd annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 26 to 30.
American Institute of Mining & Metallurgical Engineers, regional meeting, San Francisco, July 10 to 17.
The Eastern United States Michigan Oil & Gas Exposition, Mt. Pleasant, Mich., Aug. 1 to 6.
New Jersey Oil Trades Assn., fall outing, Sept. 28.
Independent Petroleum Assn. of America, 10th annual meeting, Ft. Worth, Tex., some time in October.
40th Annual National Automobile Show, Grand Central Palace, New York, week of Oct. 15.
National Safety Congress and Exposition, Chalfont Hadden Hall, Atlantic City, N. J., Oct. 16 to 20.

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Let N.P.N. Keep You Up to Date On Refining Processes

After working for five years behind closed doors and spending millions of dollars in research, the Houdry Process Corp. grabbed the limelight at the American Petroleum Institute meeting in Chicago last November by announcing the results obtained from its catalytic cracking process for making better gasoline. The Houdry interests and its licensees are still continuing research, and are also building a dozen units for operating the process as it is now constituted.

Two other large research and development groups are working feverishly to perfect similar processes, all using the same catalyst material, information indicates. One of these groups has built at least one commercial unit, the other has also been operating units of unknown capacity. All are looking toward one end, a new process for producing more and better motor fuel from petroleum to meet the demands of the customers of today and tomorrow for better gasoline.

Too early to prophesy, it still may be said that these processes may rearrange the whole refining technology and economics. Read the story on the progress and present situation in catalytic cracking developments, in today's Refining Technology Edition of NATIONAL PETROLEUM NEWS, page R-99, and find out what the present is doing and what the future may develop. This edition of N.P.N. is sent to subscribers interested in oil refining or natural gasoline manufacturing.

Compression Ratios And Octane Numbers

By Arch L. Foster, Technical Editor

● There are those who would have us believe that the automotive industry is poised for a plunge into the manufacture of engines requiring much higher octane number fuels, that is, operating at higher compression ratios, than those now in vogue. They would affirm that this only awaits the supplying and general distribution of fuels of the requisite octane number to run those engines. We have been told, by outsiders pleas note, that engines with compression ratios of 9.0 to 1, or even 9.5 to 1, have been designed "in Detroit," and have been withheld from mass production only because of the absence of satisfactory fuels for such pressures.

The average standard compression ratio for 1939 models (6.3 to 1), did not advance beyond that of 1938 and any individual changes were few and small. At the same time the trend in octane numbers is undoubtedly upward, especially in the east and west sections of the country. Also, recent reports on experimental work carried out by our most outstanding technologists prove conclusively that for any average octane number fuel supplied in a given locality, the engine adjustments trend toward settings which permit the engine to operate satisfactorily for the customer on those fuels.

Technologists have also shown that our carburetor and fuel manifold systems vary so widely and with such lack of uniformity that these disadvantages more than outweigh even the difference in power obtainable from premium fuel of 78-80 octane number as compared to that from 70-72 octane number fuels.

Furthermore, other technologists have shown that, due to variations in mechanical arrangement from cylinder to cylinder in the same engine, different cylinders in the same car require fuels varying by 15 or 20 and even more octane numbers. Spark timing cam shafts vary so much in their—unadjustable—timing that differences in spark advances cause a difference of as much as nine octane numbers. This spread is about the maximum between regular and Ethyl gasoline; therefore, to follow the implication to the ultimate conclusion, it would be necessary for the customer to arrange to have the fuel fed to each cylinder which best suited it, that is, carry both regular and premium fuel to avoid knock and dissatisfaction.

Under such conditions, even though they may not be true in the majority of car engines, the refiner cannot hope to avoid fuel complaints, unless he supplies a fuel so high in octane rating that no trouble comes whatever the variation in quality needed. He must cover the errors and bad mechanical condition of the car by furnishing a fuel unnecessarily good for some engines and cylinders in order to keep the others out of trouble.

A spread of even five octane numbers is too expensive and too unnecessary to ask the refiner to shoulder the burden. Octane numbers cost money, and an increase of five above that necessary for a properly built and adjusted engine is a staggering load.

If these variations reported are typical of the differences found generally throughout automotive engines, then the demand that higher octane number fuels be supplied by the refiner, and the movement, if it is threatening, that higher compression, higher efficiency engines be produced, should both wait on the completion of the man-sized job of removing from our eye the beam of poor adjustment and manufacture in the engines we now experience.

That the refiner can supply fuels of higher octane number than are now available is known without question. Those who do not like the performance of regular fuels at regular prices can easily obtain premium grades; that is the market for which Ethyl gasoline is designed. If they must have 87 octane number fuels to build really suitable engines for, the refiner can supply that too—at a price. But it can't be made at the present price of regular fuels, nor can we now foresee when technology can accomplish that miracle.

When the variation in the octane number requirements of the different cylinders in a single engine, or between two engines of the same model and make is greater than the octane range between third grade and premium grade gasolines, when that variation is due purely to mechanical discrepancies which can be eliminated or greatly reduced by proper manufacturing methods, any cry for higher octane number fuels is one of "Carry my load because I don't want to take the trouble." And we believe that automotive manufacturing progress in the next very few years will largely correct whatever errors exist. Meanwhile the refiner must be on his own toes, to avoid their being trampled on by progress.

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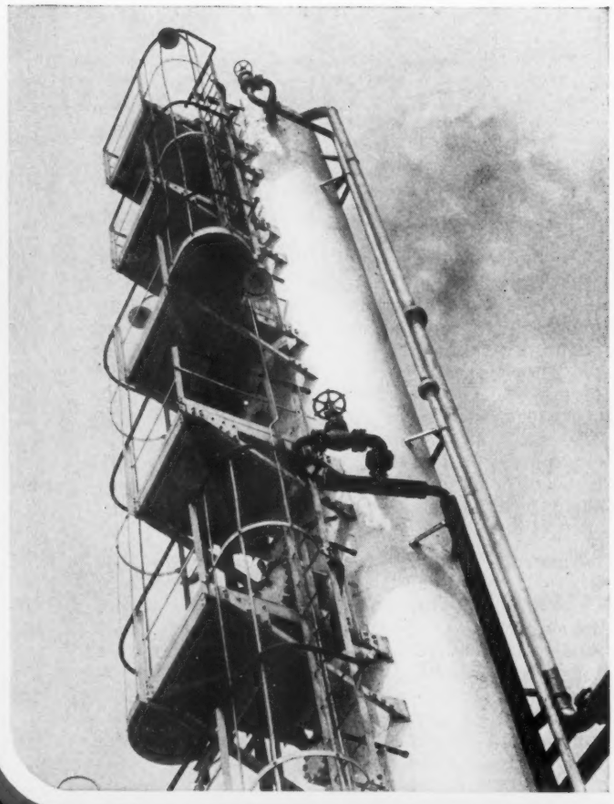
Refining Technology



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Three Organizations Rush Catalytic Cracking Process Development

By Arch L. Foster
Technical Editor

THREE powerful refining research groups are working intensively to find out what catalytic cracking is all about. Interest of technical and research organizations did not spring into being suddenly, with last November's announcement by the Houdry Process Corp. of the main details and results of its catalytic processes. For several years research laboratories have been scouring this field. In November it appeared that the Houdry group had scooped the field, was ahead of everybody in the race. Since then work by the other groups has been intensified to such an extent that the rapid development may be a catch-as-catch-can bout. Refiners who will have to put up the money when plants are built, are using the eagle eye on the whole thing, uncertain in most cases which way to turn.

The three research groups now may be designated approximately as the Houdry Process Corp., owned principally by Sun Oil Co., Socony-Vacuum Oil Co., and a number of French investors; Universal Oil Products Co., along with several of Universal's larger affiliates and licensees. The third is the New Jersey-Kellogg group, its work based on the research of Standard Oil Co. of New Jersey and affiliated companies.

Houdry Most Active

Of these three the Houdry group has spent probably the greatest amount of money, built the largest units, and to all appearances has progressed farthest along the road to general commercial application of its processes.

Sun Oil has two Houdry units, one of 15,000 barrels at Marcus Hook, Pa., and is building a third of large capacity. Socony Vacuum Oil Co. had two units last November, and is building eight or ten more; the smallest of these units is reported to be 10,000 barrels of crude per day.

Less definite information is available on the work and progress of the other two groups. Standard Oil Co. of Louisiana, a New Jersey subsidiary, is said to be operating a large unit at Baton Rouge. Others are under plan, reports say, but no information has been disclosed regarding their status. Universal Oil Products Co. has been operating a good-sized pilot or experimental unit at its Riverside Laboratories, and one or more commercial are said to be planned by licensees of that company.

Universal also has been studying intensively the catalytic field for some years. This work began in earnest with the coming of the veteran Russian authority, V. N. Ipatieff, to the UOP staff to head that work some five years ago. Catalytic polymerization of unsaturated refinery gases is one of the outstanding results of the work of that laboratory. In addition to the work of this company alone, the research efforts and patent structure of two or three large organizations are probably combined with that of UOP to form a comprehensive coverage and to bring into line a large research capacity working toward a common end.

To sum up: the refining capacity represented by these three groups shows that at least half the cracking facilities of the country are directly represented as part owners of catalytic cracking processes. In addition the licensees of Universal may be considered to be directly interested in, and potential prospects for, adoption of a successful commercial process. The same may be said for the licensees of Gasoline Products Co. in which the New Jersey group is heavily interested.

The Houdry group controls roughly 300,000 barrels per day of thermal cracking capacity at present. That is, this is the approximate figure in which we include Standard Oil Co. of California, a recent licensee of Houdry which we understand will build a pilot plant soon to study catalytic cracking of California oils. California Standard is also a large licensee of the Dubbs process, and if grouped with Universal would add more than 100,000 barrels capacity to that group, detracting the same amount from the Houdry total. Standard of California also owns a large stock interest in the UOP organization.

Universal represents a probable total of 500,000 barrels of thermal cracking capacity counting only those large companies which are affiliated with it in this catalytic enterprise. In addition there is a large cracking capacity among its smaller licensees, which are potential licensees for any catalytic process which may be offered in the future as a commercial success.

The New Jersey group, totaling five companies of large size, controls at least 400,000 barrels per day thermal cracking capacity. In addition licensees of Gasoline Products Co. in other companies, include probably an approximately equal capacity, as a possible field for license of any process that group may develop.

All together, these three groups represent a conservative estimate of ownership of 1,500,000 barrels of cracking capacity in this country. The actual representation is doubtless much larger. Counting licensees of course practically our entire cracking capacity would be included.

For the refiners who wish to get into the procession, the problem of decision is a headache. Every large refiner in this country is waiting for further developments. All are uncertain as to which process will offer the best opportunities as to operating and installation costs, or the details of which will fit their own operations best. Licensing organizations are being besieged by smaller refiners, asking for estimates on units ranging from 500 barrels per day up. None of these groups developing processes can satisfy the demand, so far as small units is concerned, unless announcements to be made before the Western Petroleum Refiners Association this week may take that direction.

Because of the inability to get answer to many of these questions to the inquirer's complete satisfaction, refiners are watching developments with extraordinary care. Technologists do not appear to believe that catalytic cracking will supplant thermal operations. Rather catalysis is referred to as supplementary to pyrolytic cracking.

Catalyst Regeneration Problem

Probably the greatest problem now faced by researchers is the satisfactory and inexpensive regeneration of the catalyst. Carbon is formed in large quantities, depositing on the catalyst. It must be removed by burning, producing a large amount of heat in the combustion gases which must be utilized to give a satisfactory operating cost figure. In one case we are told that a material balance calculated from published figures shows a cracking loss to carbon—coke—burned from the catalyst of 11% to 13% or thereabouts. If this be correct, then the coke produced in thermal cracking is paralleled by that made in catalytic cracking. The thermal cracking coke is removed and is sold as such or becomes a refinery disposal problem, while the catalytic carbon is burned to produce heat which may be used in the plant to heat stills, steam boilers or for other purposes.

Nevertheless, the company which works out the cheapest method of regeneration and the lowest loss to carbon,

on the catalyst or elsewhere, has a distinct advantage in the opinion of technologists who have carefully studied the problem. Many other factors enter the picture, such as the cost of auxiliaries for utilizing the extra and otherwise waste heat produced, cost of catalyst cases and automatic operating equipment as compared to reaction chambers and coke-disposal equipment in thermal cracking.

So far as information is available, all three groups are studying and using some form of the same catalytic agent. This is bauxite or aluminum oxide of one type or another, processed and formed into various shapes and sizes of pellet, designed to aid passage of vapors and intimate contact of vapors and catalyst. Since the catalyst material probably cannot be patented, the only field which remains for patent coverage is that of the shape, size and form of catalyst pellet, and equipment and methods for so processing it.

Even those who have investigated the patent structure of each group are hesitant to venture a guess as to which may have a theoretical advantage in that field. Rumor has it that various methods are used to handle the catalyst in contacting the vapors. One method employs a solid bed of pellets through which the vapors pass, and in which means are provided to introduce air for regeneration. In another method catalyst pellets are placed on trays in towers, with vapors passing through these trays much the same as bubble plate arrangements in fractionating towers. Doubtless many important points involving catalyst preparation and use are buried from the outsider's eye in patent applications yet to be passed on by the Patent Office.

Many of these conditions which may now be classed by technologists as disadvantages are more likely merely the growing pains incidental to the rapid development of an important engineering discovery. The best information indicates that the advantages to be derived from catalytic cracking are important and possibly may be controlling factors in tomorrow's cracking technology. Yields of as high as 45% in one pass are given for Houdry process operations. Octane numbers as high as 85 are quoted, which if producible at a comparable overall cost gives the refiner a blending fluid for motor fuels which will be at a good premium.

Aviation fuels up to 100 octane number have been produced in large quantity by the Houdry process (seven million gallons in 1937-38), by the blending of catalytically treated Houdry product with tetraethyl lead, iso-octane, iso-pentane, natural gasoline or combinations of these products. With our present and ever-increasing prospects for these super-fuels for both military and commercial aviation, this field is no small one for this type of refinery product. The U. S. Army and Navy Air Corps have planned to use up to a million barrels of 100 octane number fuel this fiscal year. With the present intensified activity in military aviation these figures may be too conservative when the year is ended.

The major interest of every refiner is in motor fuel. So they are watching to see what can be gained by the adoption of catalytic cracking either in manufacturing cost, in anti-knock quality of product for blending to maintain or raise octane numbers, or preferably in both. Whereas thermally cracked gasoline may rate 74-75 octane number, if catalytically cracked fuel reaches 78, 80 or 85 octane number at a comparable figure the economic and technical advantages loom large in the refiner's picture.

Alkylation, Aromatization Methods Developing

The refiner cannot overlook the rapid strides in perfecting alkylation methods. Alkylation is similar to polymerization, except that in the latter two molecules—or more—of unsaturated hydrocarbons are combined to form larger, still unsaturated molecules in the gasoline boiling range. Alkylation is the combination of an olefin and a paraffin molecule to form a larger, saturated molecule, which does not require hydrogenation to produce the saturated iso-paraffin as does the polymerized product. This simplicity should reduce cost and presumably increase yields by alkylation, and mixtures of paraffins and olefins are found in all refinery gases which may be concentrated and isolated to give the correct proportions for profitable operation. Further, dehydrogenation by known methods such as that announced by Shell Development Co. last September (N.P. N., Sept. 7, 1938, page R-432) using activated alumina catalysts, will supply the necessary olefins even from natural gases. The alkylation catalyst used is sulfuric acid, and while difficulties have been encountered in controlling the reaction within desired limits, this process gives promise of developing into an important process in the future.

One hydrogenation unit has been or is being converted to the alkylation process, rumor says, on a commercial scale. Since recently adopted hydrogenation processes use sulfuric acid also as the reacting agent, the change-over doubtless offers relatively little difficulty.

Aromatization and cyclization are still in the research and experimental stages, so far as definite information can be obtained. Aromatization means simply the rearranging of aliphatic, or saturated hydrocarbons into molecules of the benzol type, high in anti-knock qualities. Cyclization means the conversion of paraffinic hydrocarbons into saturated closed chains which also improves the anti-knock properties. What these processes may eventually develop is uncertain now, but their progress will be watched with a great deal of interest, as several laboratories carry on research.

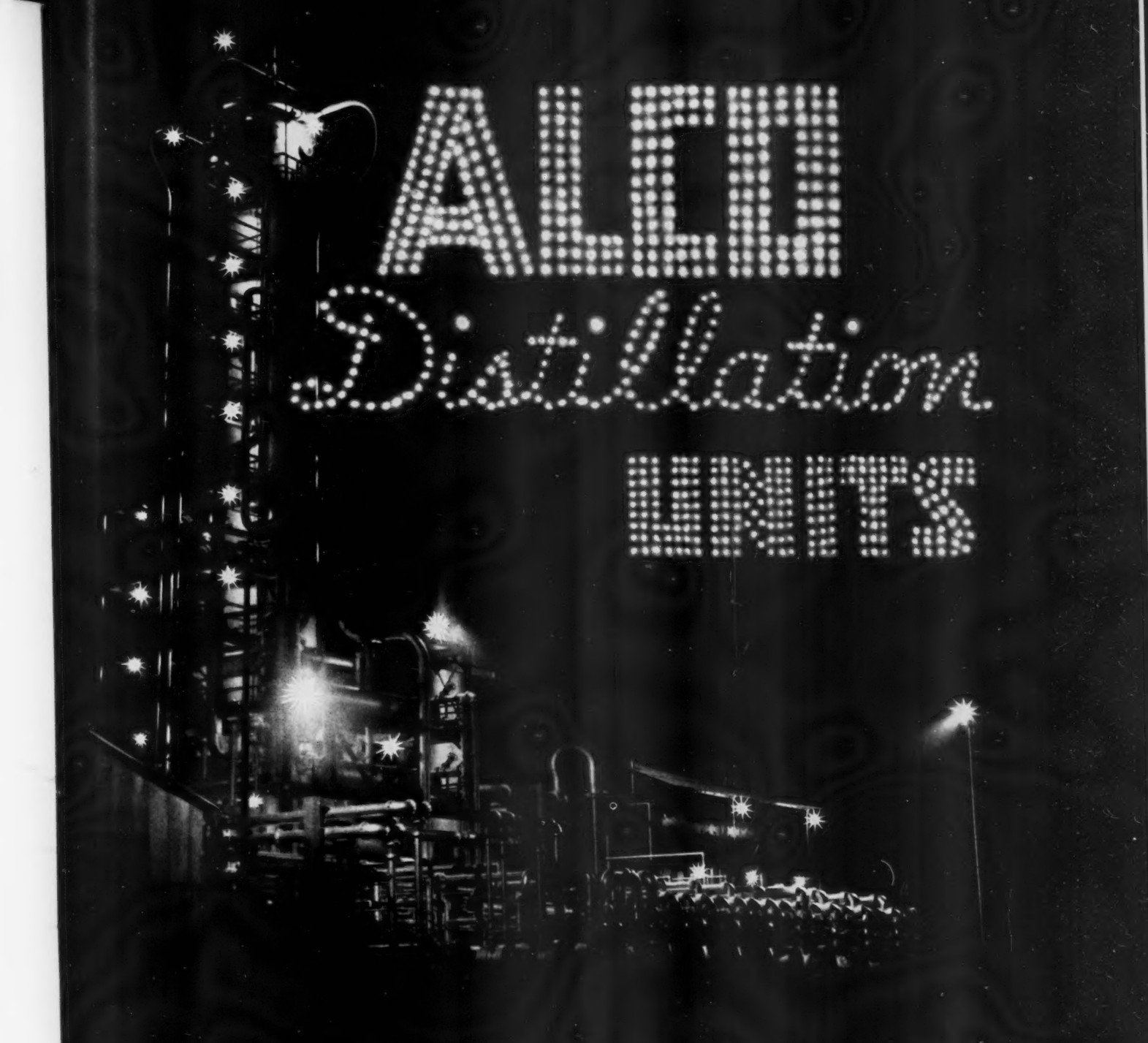
G. I. Roberts (right) and Dick Faulkner (left) are appointed assistants to B. H. Barnes, new general superintendent of Gulf Refining Co.'s plants in Texas. Roberts has been an engineer with the Gulf company since 1915, and recently has been assistant to T. J. Sullivan, now assistant general manager of manufacturing for the company.

Faulkner was field engineer at the Port Arthur plant for several years, and succeeded Barnes as superintendent of the Toledo, Ohio, refinery in 1935.

Gulf Promotions Announced

T. J. Sullivan, (right) recently appointed assistant general manager of manufacturing for Gulf Refining Co., will make his headquarters in Pittsburgh where he will be associated with W. A. Slater, general manager. Sullivan came to the Gulf company at Port Arthur, Texas, in 1921 as superintendent of the acid plant, became assistant to Slater, then general superintendent at Port Arthur, in 1931 and succeeded to the general superintendency in 1935 when Slater was made general manager.

Bonner H. Barnes (left) is appointed general superintendent of Gulf's refineries in Texas, has been assistant superintendent under Sullivan since 1935. Barnes came to the Gulf plant at Port Arthur as chemist in 1921, from Texas A. & M. College, was made superintendent of Gulf's Sweetwater, Texas, refinery in 1929, and in 1931 was appointed superintendent at the Toledo, Ohio, plant.



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Alloy Bearing Corrosion Problem Yields in Laboratory Attack

By F. L. Miller*

This article is a condensation of a paper presented by Mr. Miller before the Metropolitan Section of the Society of Automotive Engineers meeting in New York, March 9, 1939.

WITH the experience which has been gained as a result of bearing corrosion troubles in automotive engines using the harder alloys to withstand increased bearing loads, it is now recognized that a great deal has been or can be done to minimize the likelihood of corrosion in service. The most important are:

1. Development of the new "sandwich" bearing and other new types, or treatment of present bearings with Indium (or other special treatment) to render them less susceptible to corrosion.

2. Improvement of engine design to make them run cooler and to lighten bearing loads and strains.

3. Proper selection and refining of the crude oil. (The rumor that corrosion troubles were associated with the solvent extraction process has been shown groundless.)

4. Use of corrosion inhibitors in the oil.

In spite of all of the steps which have been taken to minimize bearing corrosion, it is probably impossible to eliminate it completely. Any oil will form corrosive acids if the temperature is maintained high enough. It will still be possible to develop some particular set of operating conditions which will be sufficiently severe to cause corrosion, even with engines and bearings of better design and with oils of better quality. However, such occurrences should be less numerous than failures of the ordinary types of bearings due to fatigue and breakdown.

It has long been evident that the usual babbit compositions, because of their tendency to fatigue and crack, eventually causing bearing failure, would have to be improved or replaced. Among the most promising alloys were cadmium-silver, cadmium-nickel, and copper-lead. In some cases Satco metal, a high lead content alloy, was and is also being used. Their adoption was followed by corrosion troubles in the field.

The difficulties occurred particularly in the south and southwest where sustained driving at high speeds (70 m.p.h. or higher) was more common and where crankcase temperatures sometimes went as high as 300° F. They occurred where engines were overloaded as in certain so-called light duty trucks and in certain makes and models of cars. They also occurred with certain brands of oils, especially those containing acidic oiliness addition agents.

The conclusions regarding minimization of bearing corrosion are the result of tests made in the laboratories of Standard Oil Development Co. during a study of the problem. These consisted of a series of car tests run on a chassis dynamometer at 70 m.p.h. with road load and later engine dynamometer tests. A pronounced effect of engine operating conditions was found.

*Standard Oil Development Co.

In all cases careful examinations were made on the used crankcase oils. Neutralization and saponification numbers, in particular, were closely followed. Underwood corrosion tests were correlated with car and engine tests. Such data on the used oils, along with the results of car and engine tests and of field reports, made certain simple generalizations obvious.

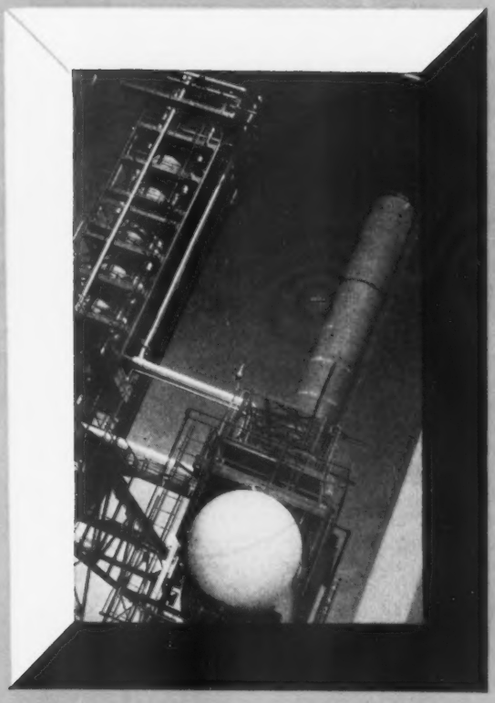
In the first place, corrosion occurred only when engine operating conditions, either temperature, speed or load, or combinations of these, were severe. In the second place, the used crankcase oils showed the development of considerable acidity and saponifiable material, the latter often amounting to as much as 30 to 40 mg. KOH/gm. This was evidence that oxidation must have occurred. The degree of acid development is indicated by typical data which have been included in Table 2.

Finally, and probably extremely significant, corrosion occurred only with those metals, cadmium in the cadmium alloy bearings, and lead in the copper-lead and Satco bearings. These metals are known to react readily with organic acids to form soaps which are relatively soluble in mineral oils. The mechanism of the reactions which finally result in corrosion is not entirely clear. Apparently the initial step consists in oxidation to form organic acids. After a certain concentration has been built up, they react with the susceptible metals at the surface to form soaps which are soluble in the hot oil and are consequently washed off the surface, allowing subsequent metal layers to react similarly. Probably the higher molecular weight acids are most active.

On the other hand, there is some evidence that even the low molecular weight acids are also corrosive. It is possible that they may react with the metals to form salts or soaps which are partly soluble at high oil temperatures. After corrosion has begun it proceeds rapidly. The soaps dissolved in the oil apparently act as catalysts for further oxidizing the oil and building up the concentration of corrosive acids.

Corrosion, although obviously related in some way to the acidity developed in the oil, is not necessarily directly proportional to it. The age of the engine influences the time required to obtain corrosion in the test runs. The tendency to corrode becomes less as the engine becomes worn (See Table 5). On the other hand, the amount of acid formed is more a function of the time the engine is run, regardless of its age. In other words, the development of acidity is largely related to the time of running the engine, but whether or not corrosion occurs is largely dependent on how long the engine has been operated pre-

Cracking Process Selection



As new cracking processes and methods are developed and new equipment is perfected, the refiner must decide which will best suit his individual needs.

Gasoline Products Company, in conjunction with several of the larger refiners, has long conducted intensive research and development work in the field of pyrolytic cracking and is in a position to assist the refiner in selecting the proper specialized cracking unit, or combination unit, to meet his particular problem.

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Table 1

Chassis Dynamometer Bearing Corrosion Tests—Cadmium Alloy — Oil G — Speed 70 m.p.h.

	Rear Wheel Horsepower	Oil Temp. (Average)	Oil Pres. Initial	(Lbs./in.²) Final	Length of Test	Loss of Wt. of Bearings
Car I (1935)	39	336	30	16.5-13	245 mi.	6.95 gms.
Car I (1936)	39	286	46	33.0	448 mi.	2.61 gms.
Car II	51	228	26	24.5	2500 mi.	0.043 gms.
Car III	51	233	33	31.5	2423 mi.	0.012 gms.

viously. This indicates that operation, insofar as it punishes the oil, is less severe as the engine becomes worn, but that this less severe operation is not reflected in any material reduction in the rate of acid formation. Perhaps this effect of engine age helps to explain why corrosion has not been more of a problem in service.

The petroleum industry has now made oils of satisfactory corrosion resistance widely available. Practically all motor oils which were somewhat corrosive in the beginning are now providing products having good corrosion properties. In most cases this has been accomplished either by the proper selection of crude and application of different refining processes or through the use of so-called corrosion inhibitors. It happened that one of the worst offenders in the beginning of the corrosion troubles was a solvent extracted product. This should not, however, result in condemnation of the process as such. Oils of excellent resistance to bearing corrosion have been manufactured by solvent extraction methods. Just as there may be differences in the qualities of normally refined oils, there may be differences in the qualities of solvent refined oils.

In some cases it has been impossible to provide all of the other qualities desired in the lubricant and at the same time obtain good bearing corrosion characteristics. In such cases, it has been found that excellent results can often be obtained by the use of synthetic oxidation or corrosion inhibitors. Several have availed themselves of this means of solving the problem. Generally inhibitors also impart other desirable properties to the oil so that we may look forward to their increased use in the future regardless of whether or not the bearing corrosion continues to be a problem.

The technique of the car tests on a chassis dynamometer consisted simply of running the cars at 70 m.p.h. with road load, allowing the crankcase temperature to reach a level determined previously from road operation at that speed and at an atmospheric temperature of 100° F. When corrosion begins, the oil pressure drops rapidly and a sharp break is observed in the oil pressure vs. mileage curve. The development of corrosion was followed by observing the oil pressure curve to note any tendencies to drop.

The results of car tests revealed unusual differences in the operating characteristics of different cars, and one make in particular developed extreme crankcase temperatures. Running on an oil prone to corrode alloy bearings, corrosion of bearings occurred in Car I (Table 1) in only 245 miles at 70 m.p.h. It did not occur in Cars II and III which operated at much lower crankcase temperatures, even at 2500 miles, the arbitrarily chosen length of the test. Changes in engine design which lowered crankcase oil temperature some 50° F., improved operation but did not entirely eliminate corrosion.

Because Car I was found so effective in demonstrating the corrosion of bearings and seemed to offer such an excellent means of obtaining accelerated tests, it was selected for subsequent studies. Employing the same testing technique, a number of different types and makes of oils were tested. Like the cars, the oils differed in their tendency to corrode the alloy bearings. Comparative data are shown in Table 2.

Table 2

Chassis Dynamometer Bearing Corrosion Tests Car I — Cadmium-Silver Alloy Speed—70 m.p.h.

Oil	Miles Run at 70 m.p.h. Before Failure	Loss in Wt. (Gms. per Bearing)	Acid Number (mg.KOH/gm.)
Series I			
Oil A—SAE 30	360	1.807	2.7
Oil B—SAE 30	600	0.664	8.4
Oil C—SAE 30	760	2.110	4.9
Oil D—SAE 30	921†	0.089	9.5
Series II*			
Oil G—SAE 30	245	6.85	6.9
Oil H—SAE 30	280	5.64	9.1
Oil A—SAE 30	359	5.34	8.6
Oil H—SAE 30 + Inhibitor	819	3.33	17.1
Oil I—SAE 30	766**	0.017	4.6
Oil J—SAE 30	830**	0.021	5.1
Oil C—SAE 30	1042	0.98	8.6

†Bearings not corroded. Test discontinued for other reasons.
*Engine used in Series I tests replaced because of mechanical failure.
**Bearings not corroded. Test discontinued. Oil thickened, engine varnished and stuck.

Table 3

Engine Dynamometer Bearing Corrosion Tests Car I (1936) Engine—Cadmium-Silver Alloy Speed—3900 R.P.M. (74 m.p.h.)

Oil	Equivalent Miles Run Before Failure	Average Loss in Weight (Gms.) per Bearing
Oil A — SAE 20	302-370	0.42 to 0.96
Oil C — SAE 20	1480*	0.037
Oil D — SAE 30	1480*	0.027
Oil A — SAE 20	1480	0.170†

*Length of test arbitrarily selected as 20 hours (74 m.p.h.) if failure did not occur.
†Failure would probably have occurred soon.

Table 4

Effect of Engine Speed on Bearing Corrosion—Car I (1936) Engine—Cadmium-Silver Bearings

Oil	Speed—R.P.M.	Equivalent Oil Line Temp. °F.	Miles Run Before Failure	Average Loss in Weight (Gms.) Per Bearing
Oil G—SAE	3500 (66.5 m.p.h.)	288	1330+	0.010
Oil A—SAE 20	3500 (66.5 m.p.h.)	283	1330+	0.010
Oil A—SAE 20	3900 (74.0 m.p.h.)	290	330	0.42 to 0.96

Table 5

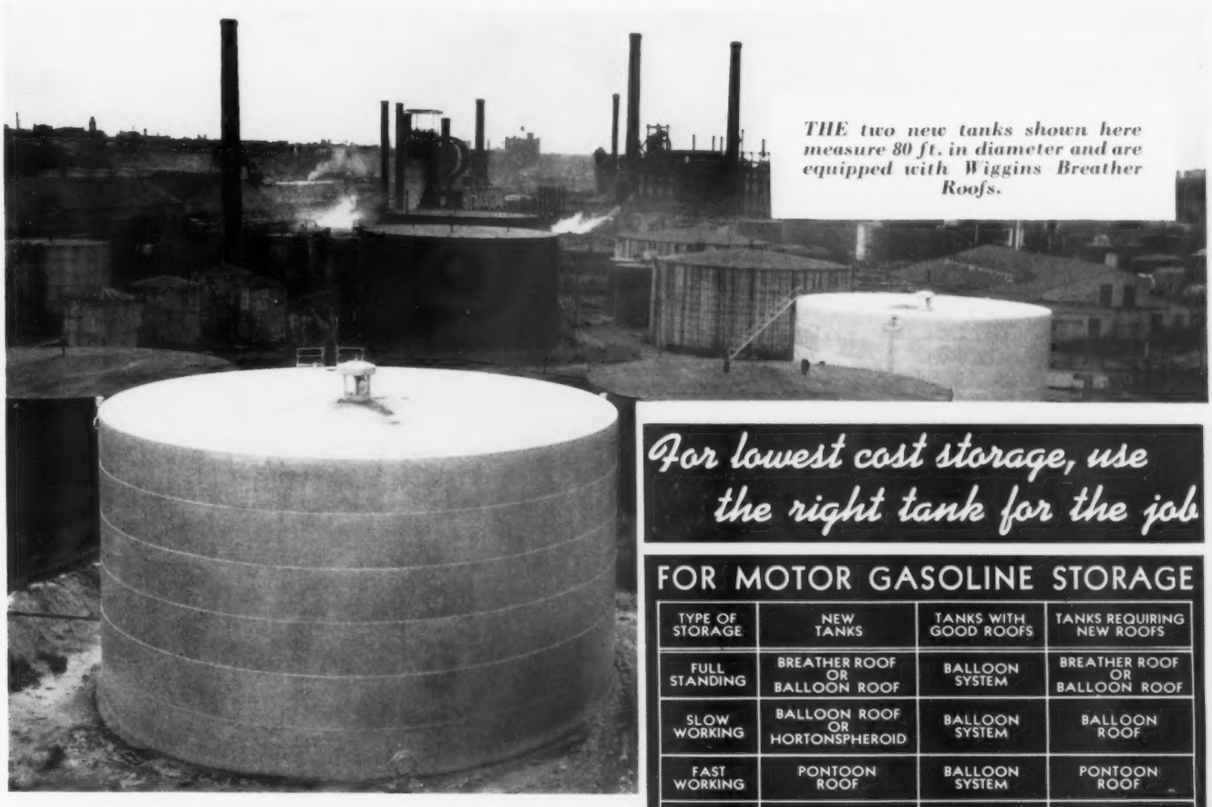
Effect of Engine Age on Bearing Corrosion Car I (1936) Engine—Cadmium-Silver Bearings Speed—3900 R.P.M. (74 m.p.h.) — Oil A — SAE 20

Age of Engine Miles	Equivalent Miles Run Before Failure	Average Loss in Weight (Gms.) Per Bearing	Acid mg. KOH/gm.
370	370	0.84	4.07
2,220	346	0.96	4.17
4,070	302	0.42	2.71
7,030	703	0.63	6.04
7,920	889	0.73	7.39
13,400	1036	0.50	6.2
18,500	1610	0.75	8.1

When the car chassis dynamometer tests were discontinued in favor of engine dynamometer tests which were simpler and more economical to run, the results obtained with Car I (1936) engine closely paralleled those secured during the car tests. This is shown in Table 3. The pronounced effect of engine operating conditions on the extent of bearing corrosion is shown in Table 4. For example no corrosion was observed with either Oil A (SAE 20) or Oil G (SAE 30) in the equivalent of 1330 miles of running at 3500 r.p.m. (66.5 m.p.h.). At 3900 r.p.m. (74 m.p.h.), however, Oil A corroded the bearings in around 330 miles. It is entirely possible that either oil would have continued indefinitely at the slightly lower speed without causing any difficulty.

The above tests were all run using cadmium alloy bearings. A limited number of tests were also run on copper-lead bearings, the second of the two most important types of alloys normally employed. In general, the copper-lead bearings showed much greater resistance to corrosion and longer times of running. In the car tests with Car I (1935) 2369 miles were run on Oil G (SAE 30) before failure occurred as compared to only 245 miles with the cadmium bearings. In the Car I (1936) engine, Oil A (SAE 30) successfully completed the equivalent of 2220 miles of running without bearing failure, whereas the cadmium bear-

WIGGINS BREATHER ROOFS



THE two new tanks shown here measure 80 ft. in diameter and are equipped with Wiggins Breather Roofs.

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TYPE OF STORAGE	NEW TANKS	TANKS WITH GOOD ROOFS	TANKS REQUIRING NEW ROOFS
FULL STANDING	BREATHER ROOF OR BALLOON ROOF	BALLOON SYSTEM	BREATHER ROOF OR BALLOON ROOF
SLOW WORKING	BALLOON ROOF OR HORTONSPHEROID	BALLOON SYSTEM	BALLOON ROOF
FAST WORKING	PONTOON ROOF	BALLOON SYSTEM	PONTOON ROOF
HIGHLY VOLATILE	HORTONSPHEROID		

FOR CRUDE OIL STORAGE

TYPE OF STORAGE	NEW TANKS	TANKS WITH GOOD ROOFS	TANKS REQUIRING NEW ROOFS
FULL STANDING	BREATHER ROOF	BALLOON SYSTEM	BREATHER ROOF
SLOW WORKING	BREATHER ROOF OR BALLOON ROOF	BALLOON SYSTEM	BREATHER ROOF OR BALLOON ROOF
FAST WORKING	PONTOON ROOF	BALLOON SYSTEM	PONTOON ROOF
SOUR OILS	BREATHER ROOF OR PONTOON ROOF	BALLOON SYSTEM	BREATHER ROOF OR PONTOON ROOF

FOR any given oil storage requirement, it is usually possible to figure which particular type of storage tank will prove to be the most profitable investment. The above charts indicate the general applications, but, of course, there are exceptions to these recommendations. For specific recommendations, we suggest that you get in touch with our nearest office.

DESPITE the fact that it is the simplest and least expensive of the various types of evaporation saving equipment, there are numerous instances where the Wiggins Breather Roof is unexcelled by any of the others, regardless of price, when it comes to saving vapor and giving you lowest actual storage cost per year. As indicated in the charts at the right, Wiggins Breather Roofs are recommended primarily for standing storage tanks, 60 ft. in diameter or larger, that are kept full or nearly full most of the time. Within these limits, they are able to eliminate virtually all breathing loss from any grade of oil that does not boil at ordinary atmospheric temperatures.

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New York	3315—165 Broadway Bldg.	Birmingham	1534 North Fiftieth Street	Boston	1516 Consolidated Gas Bldg.

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Table 6
Underwood "Life" Data

	Life (Hrs.) Underwood Test
Oil A—SAE 30	4
Oil B—SAE 30	9½
Oil C—SAE 30	12
Oil D—SAE 30	19
Oil G—SAE 30	3+
Oil H—SAE 30	2
Oil H—SAE 30 + Inhibitor	6
Oil I —SAE 30	>20
Oil J —SAE 30	>20
Oil A—SAE 20	2½
Oil C—SAE 20	8
	6

Table 7
Underwood Life Data on Solvent Extracted and Conventionally Refined Oils

	Life (Hours) Underwood Test
Oil D—SAE 30—Solvent Extracted	19
Oil K—SAE 30—Solvent Extracted	12
Oil L—SAE 30—Solvent Extracted	15
Oil M—SAE 30—Solvent Extracted	25
Oil A—SAE 30—Solvent Extracted	4
Oil G—SAE 30—Solvent Extracted	3+
Oil N—SAE 30—Unextracted	3
Oil B—SAE 30—Unextracted	9½
Oil C—SAE 30—Unextracted	12

ings failed in around 330 miles with this oil. More recent data, however, have shown that the copper-lead bearings are not always superior to the cadmium. With certain types of compounded oils they may be more susceptible to corrosion. This reversal of behavior is undoubtedly the exception rather than the rule and is not encountered with the usual run of motor oils.

When the results of the car and engine tests, expressed in terms of miles run before failure, were plotted against laboratory-determined Underwood "life" values, in hours, for the different oils, a reasonably good correlation between the two was obtained. In the Underwood test an apparatus for heating and circulating the oil and spraying it forcefully against the test bearings, is employed. Since, like the automotive crankcase, it has access to air, oxidation also takes place and plays an important role in the test. The test is run with an oil temperature of 350° F., the bearings being taken out periodically for observation and weighing to determine when corrosion begins. If the loss in weight is plotted against time, a sharp break in the curve will be noted. The point of intersection of the tangent to the curve after it has broken is considered to represent the "life" of the oil. "Life" comparisons of oils are given in Table 6 and Table 7.

The availability of the Underwood test has made it possible not only to compare the corrosion resistances of lubricating oils for predicting performance in the engine but also to study the problem more extensively than would be possible by means of engines alone. It has been particularly valuable in determining the effect of temperature, which has appeared to be an important factor, on corrosion. Data from these tests show that the difference in temperature levels at which the same degree of corrosion will occur with a medium corrosive and one of the most corrosion resistant oils is relatively small, being of the order of magnitude of 20° F. in the neighborhood of 325-350° F. In other words, it is necessary to change the temperature relatively little to render even the fairly stable oils corrosive at these relatively high temperatures. This would explain why in many cases only seemingly slight changes in operating conditions may greatly affect the tendency toward corrosion, particularly if the operation is very near the borderline for the oil.

At present, alloy bearings are not being used as widely as they were several years ago and the problem is not as important as it was. As fuels of better anti-knock quality gradually become available, it is to be expected that the engine manufacturer will take advantage of the improved fuel characteristics by making changes in his engine design, such as improved fuel characteristics, which may create anew the demand for improved types of bearings.

References

1. F. C. Smart, "Metals Technology," Tech. Pub. No. 900 (Preprint, April, 1938)
2. P. D. Foote, Jour. Applied Physics, 8, 19-33, 1937

Table 8
Bearing Corrosion Tests — Effect of Inhibitor

Lubricant	Life of Oil in Laboratory Corrosion Test (Hrs.) Original	Type of Bearings	Length of Test	Average Loss in Weight (Gms.) per Bearing
Engine 1				
Oil H—SAE 20	2	Cd–Ag	330	.....
Oil H—SAE 20 + 1.25% Paranox Oxid. Inhibitor	8	Cd–Ag	1480	0.170
Engine 2				
Oil H—SAE 20	2	Cu–Pb	2220	0.688
Oil H—SAE 20 + 1.25% Paranox Oxid. Inhibitor	8	Cu–Pb	2220	0.104

Table 9
Data with Underwood Test Machine

	Refined Oil	Refined Oil Plus Inhibitor
Average loss of weight of Cu-Pb Bearings for 12 hrs.	0.1827g	—0.0123g
Average loss of weight of Cu-Pb Bearings for 22 hrs.	0.4796	0.0019
Average loss of weight of Cd-Ag Bearings for 12 hrs.	1.7532	—0.0054
Average loss of weight of Cd-Ag Bearings for 22 hrs.	1.8068	—0.0004
Viscosity, S. S. 100° F.	998.	272.
Per cent Increase Viscosity at 100	290	0.6
Viscosity, S. S. 210° F.	89.3	52.1
Per cent Increase Viscosity at 210	75	1.9
Viscosity Index	99	109
Carbon Residue	4.33	0.43
Neutralization Number	7.6	0.37
Sludge, Per Cent	2.30	0.04
Color	Black	7+(Dil.)

Barrere Joins Lummus

Clement A. Barrere has resigned as plant manager of the Bradford Oil Refining Co., Bradford, Pa., to join the Lummus Co. as process and sales engineer.

Mr. Barrere, who was manager of the Bradford Oil Refining Co. plant for two years, has had wide experience in cracking and in refining lubricating oils and asphalt. Prior to his association with Bradford, he was in charge of lubricating oils for Phillips Petroleum Co. Previous to the Phillips connection, he was for 10 years with the Texas-Pacific Coal and Oil Co., Fort Worth. A native of New Orleans, Mr. Barrere is a graduate chemical engineer, Louisiana State University. He will make his headquarters at the Lummus main office, 420 Lexington Ave., New York.

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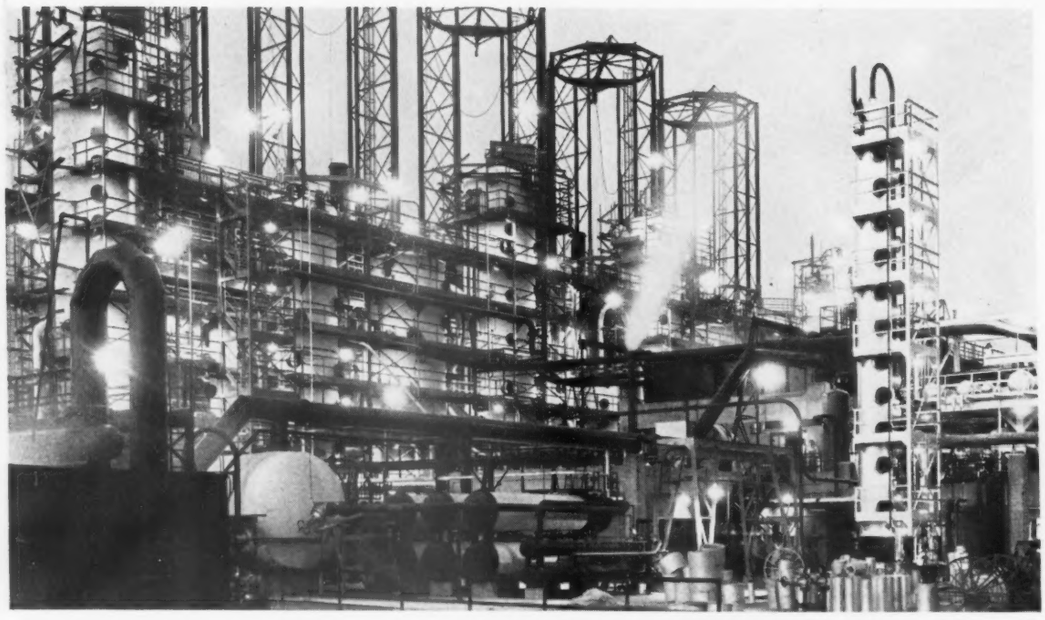
Richfield Completes $5,000,000 Refinery Rebuilding Program



The huge deFlorez down-draft cracking furnaces in Richfield Oil Corp.'s Watson, Calif., refinery, a 50,000-barrel plant costing nearly $5,000,000

RICHFIELD OIL CORP., in collaboration with Sinclair Refining Co. and with C. F. Braun & Co. as engineers and builders, has completed its $5,000,000 refinery rebuilding program. The refinery at Watson, Calif., is built around two combination topping-cracking units using deFlorez vertical type cracking heaters. Each unit handles 25,000 barrels or more of crude and reduced crude per day.

Completion of this huge program followed on the reorganization of the company in March, 1937, which consolidated Richfield Oil Co., Rio Grande Oil Co., and Pan American Petroleum Co. into one organization. Decision was made to concentrate refining capacity in a single revamped plant, with Rio Grande's modernized but too-small refinery at Vinvale as standby in case additional capacity was needed. Contracts were let for construction in July, 1937; one cracking unit was fired the middle of August, 1938, and the second early in September.

The efficiency of modern refinery design and construction methods are shown by the fact that each unit was started cold, run for 30 days without interruption, and then shut down for routine inspection, without any shutdowns in these initial runs due to poor design or faulty construction. Not a life was lost or a serious injury occurred during construction of the plant.

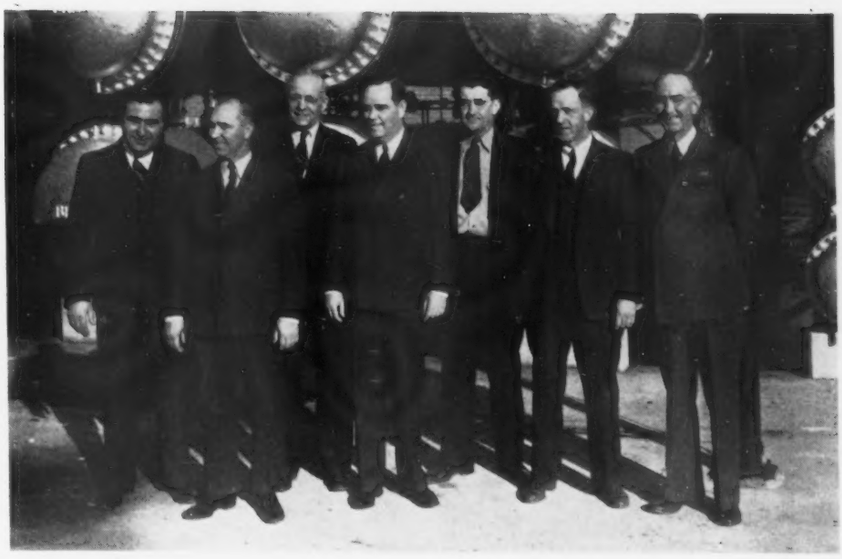
The size of these huge co-ordinated units, using a common instrument board is indicated by the primary fractionating and evaporating towers, seven of which are installed, the two largest being 13 feet diameter, 60 feet high, weighing a quarter of a million pounds each. Each was fabricated in the Braun shops and one-way traffic was maintained on the railroad which carried them to the plant, since traffic could not pass on adjacent tracks. The entire plant includes 22 bubble columns and 110 heat exchangers, coolers and condensers.

Because of the possibility of earthquakes in this area, all concrete and other structures are built with both horizontal and vertical reinforcements. Six deFlorez cracking furnaces are installed, containing seven miles of chrome-moly alloy tubes, each rolled into alloy steel headers, giving 1900 rolled joints, not one of which leaked enough to stop the unit when its initial run started. The electrical installations required 40 miles of lead cable and rubber-insulated wiring; in addition 16 miles of thermocouple wiring, housed in galvanized conduit was used. As corrosion protection, 11-13% chrome alloy sheets line all towers operating at above 600° F. temperatures.

The units use more than 100 diaphragm motor valves, from ½-inch to 10 inches in size. Fourteen other valves are operated by explosion-proof reversible motors while two Siecyn motor controls, all through gear trains. The common instrument board is eight feet high by 83 feet long, and supports 137 instruments, including 43 flowmeters, 28 flow controllers, 26 pressure gauges, 22 recording potentiometers, eight recording potentiometer controllers and two indicating potentiometers, each of the latter connected to a 96-point switch panel. By adding 75 extra pens to instruments recording related data the number of instruments was reduced materially. A Philco-phone system permits easy communication between strategic points in the plant, with 15 outside stations.

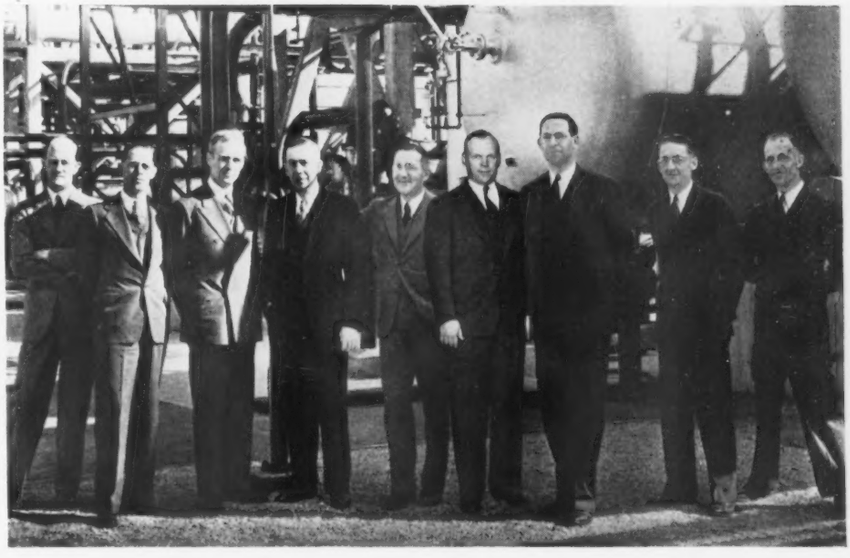
These deFlorez units are the largest ever built, the six having a heating capacity of 480 million B.t.u. per hour, and an efficiency of about 80%. The large heat exchange capacity provided in the plant recycles about one-third of the heat required for the process, 100,000 of the 300,000 B.t.u. per barrel of throughput required being obtained by exchange with different product streams.

The plant tops California crude by heat exchange, and the topped crude is heated to 700° F. and flashed in a vacuum evaporator, the overhead is condensed in a tower, from the bottom of which the 1000 h.p. motor-driven, 6-stage centrifugal cracking charge pumps pick it up. Each pump feeds three down-draft heaters, the cracked charge is flashed in the large tower and 400° F. endpoint cracked distillate is taken overhead, recycle stock from the tower bottom returning to the feed tanks. The debutanizer and stabilizer gases are de-sulphurized in a Shell Development Co. tri-potassium phosphate, removing about 90% of the hydrogen sulfide, and polymerized in a U.O.P. catalytic unit to convert to gasoline the 35% of butenes and propenes present.



This group is the engineering and operating staff of the Richfield organization. Left to right they are: Frank Fontana, resident engineer; H. V. Goza, foreman maintenance department; R. A. Panero, superintendent Watson refinery; C. R. McKay, manager of refineries; L. F. Strader, foreman combination units; W. C. Farquhar, refinery engineer; W. R. Davis, assistant superintendent Watson refinery

This group from the Sinclair Refining Co. engineering staff designed the Richfield plant. From left to right, seated: W. S. Gullette, development department engineer, acting as Richfield contact man, in California, with contractors during design and construction. W. Mendius, development department fractionating engineer; T. B. Kimball, development department cracking engineer; E. C. Herthel, manager of development and research department Standing: O. F. Campbell, combustion engineer; W. M. Flowers, development department cost engineer; O. G. Kaasa, instrument engineer; H. C. Kuhn, inspection engineer; W. C. Poole, electrical engineer



A group of C. F. Braun Co. engineers, who fabricated and erected the Richfield refinery. Left to right they are: H. W. Cunningham, field engineer; J. F. Haines, process engineer; P. C. McGrath, process engineer; J. A. Marchant, vice president, Braun Co.; L. I. Blennerhassett, engineer; H. W. Finney, field superintendent; A. M. Whistler, process engineer; T. J. Lingle, purchasing agent; H. A. Selindh, chief draftsman

Spark Timing Important Variable In Octane Requirements*

By L. E. Hebl** and T. B. Rendel**

ABSTRACT

In research on detonation of motor fuels, the method of using "Highest Useful Spark Advance" should be employed instead of the methods previously used in detonation studies, these authors suggest.

Power gained in automotive engines, by using fuels of octane number above 70 and up to about 90 to avoid knock, is of the order of only 1%. Spark can be retarded to avoid knock over a fairly wide range of octane numbers with very little loss in performance. To obtain maximum power at all speeds in present-day cars, an octane number of 85 is required.

In designating variation of fuel knock ratings under different conditions, the algebraic "advantage" of, for example, a cracked fuel over a reference fuel at any given speed could be given, rather than to indicate "road octane numbers" as has been done, these authors believe. Appreciation of commercial fuels over reference fuels is not constant but varies with speed; in one instance a cracked fuel showed 10 octane units better than the reference fuel at 15 m.p.h., and 8 units worse at 50 m.p.h.

L. E. Hebl, assistant director of Shell Petroleum Corp.'s engine research laboratory, is well known in refining and automotive circles for his work in the development and study of properties of motor and diesel fuels and lubricants; he is active in supervision of engine research in the Shell Petroleum Corp.'s laboratories at Wood River, and has been author or co-author of many papers dealing with these subjects before American technical societies

T. B. Rendel is associate director of the engine research laboratory for Shell Petroleum Corp. at Wood River, Ill. He has been active in the development of fuel and lubricant technology in this country for ten years, prominent in the work of the Fuels and Lubricants Activity of the Society of Automotive Engineers, in the American Petroleum Institute and other technical organizations. A part of his technical background after college training at Cambridge is several years of experience in the H. R. Ricardo & Co engine laboratories, in England

IN ORDER to take a look at the whole forest and to consider why there is such a wide distribution of octane requirements and wide variability of "Road Octane Numbers" we had first to select a suitable path out of the woods. The path which seems the easiest to take was that signposted "spark timing," for almost since the importance of detonation itself was recognized, the importance of the spark timing on the detonation tendency of an engine has been fully realized.

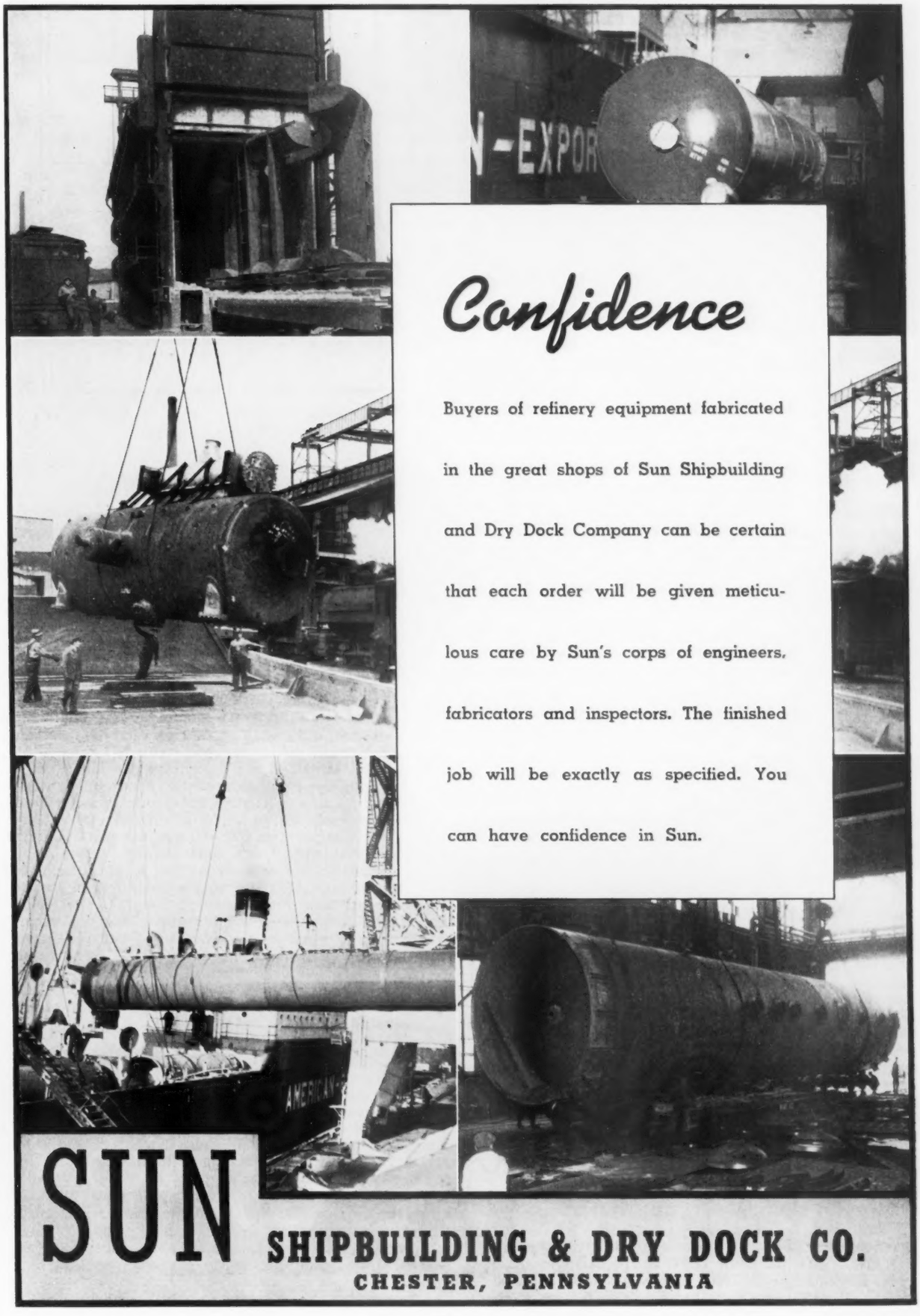
However, in order to adjust the spark timing for the varying speeds and loads encountered in service, modern engines are fitted with automatic devices whereby the spark is advanced as the speed is increased or the load reduced, but normal tolerances in distributor manufacture are too great to enable us to rely on the distributor to follow the manufacturer's specified spark timing curve. It is clear, therefore, that when measuring the relative detonation tendencies of fuels, the spark timing must be closely controlled, particularly where the tests are made by accelerating over a range of speeds, and it is important to our problem to investigate exactly the influence of spark timing on power and economy, and the limits of allowable spark advance that are necessitated by the knocking tendencies of commercial grade fuels.

Influence of Spark Timing on Power at Full Throttle

In order to determine the influence of spark advance on power, curves of spark advance versus horsepower were obtained on a chassis dynamometer at 5 m.p.h. intervals from 10 to 60 m.p.h. using nine different cars. Several fuels were used in these tests which were all above 90 octane number in order that the curves would not be

*Condensed from a paper, "Spark Timing and Its Relation to Road Octane Numbers and Engine Performance," presented before the Society of Automotive Engineers, Jan. 9-13, 1939, at Detroit.

** Shell Petroleum Corp.



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influenced by detonation. The distributor was arranged for full manual control. Curves were plotted to obtain the influence of engine speed on the maximum power spark advance. Inspection of these curves made it obvious that the spark must be advanced considerably as engine speed increases. Similar curves obtained with seven other cars show the relation is fairly uniform.

The power that is obtained when the spark is retarded from that which gives maximum power decreases more sharply at high speeds than it does at low speed. However, when the maximum power is taken as 100%, the percentage decrease at other spark timings is then found to be the same not only at all speeds, but also for all cars.

Influence of Spark Timing on Fuel Economy

Parallel with the effect of spark timing on maximum power it is also of interest to show the effect of spark timing on fuel economy. However, the measurements of spark timing required for maximum power were made at full throttle which is the condition under which maximum power is desired even at the expense of some wasted fuel. On the other hand, most operation is at part throttle where maximum power is not desired and it is permissible to sacrifice power in order to obtain maximum fuel economy. Consequently, all the fuel economy tests to be described have been made at the throttle opening which corresponds with level road load. The throttle opening was controlled on the chassis dynamometer at each speed by following a curve of manifold vacuum versus speed, previously determined by actual road test on the same car.

A set of curves was obtained in which the spark timing was plotted against the mileage per gallon of fuel, and maximum points from such curves were plotted against the engine speed, again showing a fairly universal relationship. The timing for maximum part throttle economy is seen to be considerably advanced over that for maximum power at full throttle.

As in the case of spark advance deviations from maximum power, the effect of spark retard or over-advance from that giving maximum fuel economy was also found to be the same not only for all speeds but also for all cars, when the mileage per gallon is expressed as a percentage. However, for the time being, the maximum economy spark timing can be dismissed with the observation that part throttle timing has not yet reached the point where it is limited by detonation in many cars.

Limitation on Spark Advance at Full Throttle Due to Detonation

Up to this point we have shown what effect spark advance has on the power output and fuel economy. We have now to show what limitations are imposed on spark advance due to detonation.

In previous work the use of "road octane numbers," while a convenient step in the standardization of laboratory test conditions, was found to be confusing and unnecessary. Accordingly, in this work the spark advance for incipient detonation at various speeds, i.e., the highest useful spark advance curve, was determined according to the procedure described in previous publications. A set of straight run reference fuel mixtures was used to provide a convenient range of octane numbers and the octane numbers of these mixtures will be considered to mean their A.S.T.M. octane numbers unless otherwise noted, as will those of all other fuels.

Inspection of the allowable spark advance curves obtained with reference fuel mixtures on cars G37 and A36, compared with the spark advance necessary for maximum power with two cars, reveals the following facts:

1. To obtain maximum power at all speeds without detonation would require a fuel of approximately 85 octane number.

2. When using a fuel of 70 octane number the spark can be timed to give maximum power at speeds above about 40 m.p.h., but must be retarded at lower speeds to avoid detonation. It now remains to be seen how the spark retard at low speed is accomplished and what loss in performance must be suffered.

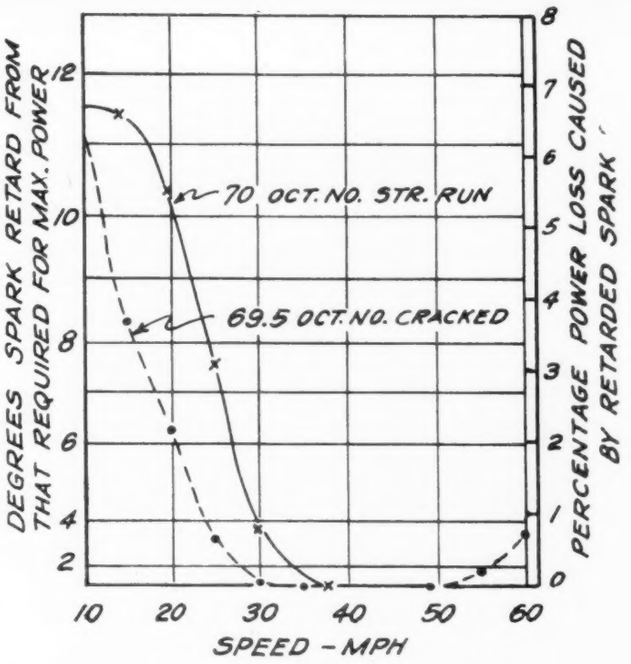


Fig. 1. Curves for power loss due to spark retard tell what gain in power could be obtained if low speed knock did not require retarding the spark

Distributor Mechanisms

Now, considering the data discussed so far, the three main requirements which have been shown necessary for the automatic spark timing mechanism are:

1. To follow the full throttle maximum power spark timing curve at high speeds.

2. To advance the spark at part throttle to obtain maximum economy.

3. To retard the full throttle spark at low speed in order to avoid detonation.

In practically all cars the automatic devices accomplish this by means of a centrifugal advance mechanism consisting of a pair of flyball weights. The full throttle spark timing curve obtained with a typical distributor, in comparison with the curve desired for maximum power and the maximum allowable curve for a commercial grade fuel, shows that maximum power is approximately obtained at speeds above about 40 m.p.h. and that the spark is retarded at lower speeds sufficient to allow about 5 degrees from the timing at which the commercial fuel would knock. However, the part throttle spark advance required for maximum fuel economy was considerably greater than that required for maximum power at full throttle. This additional advance is usually obtained by the use of a diaphragm operated by vacuum from the intake manifold. The resulting "level road distributor timing" is approximately in agreement with the timing that is actually required for best fuel economy. Tests on other cars show that these mechanisms really do a good job.

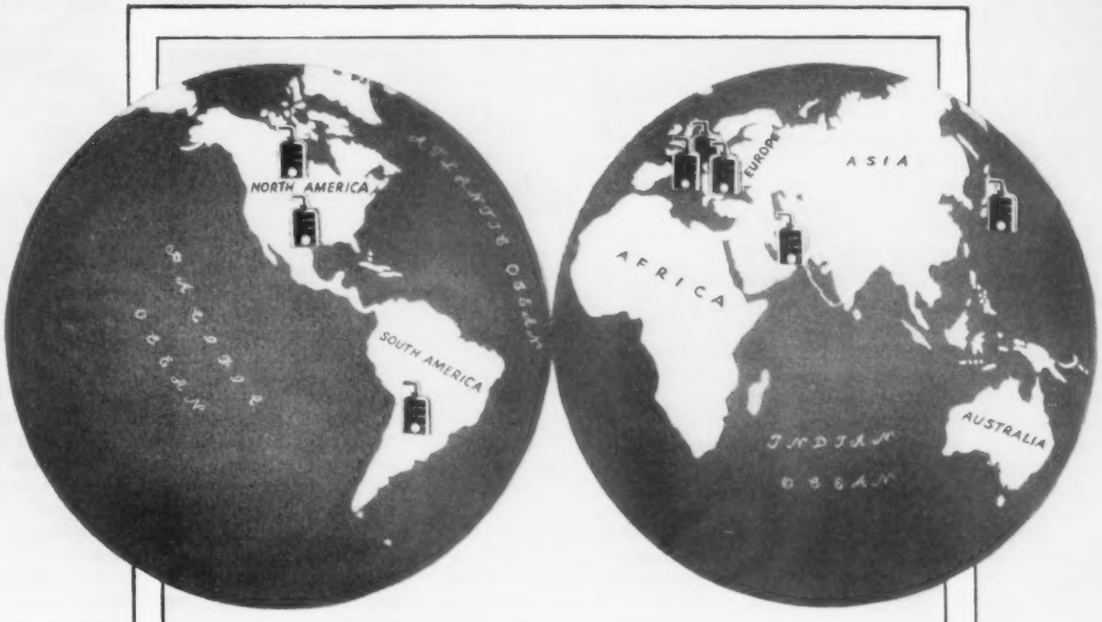
Octane Number Required For Maximum Power

We have now shown what spark timing is required for maximum power and economy, and further, that modern distributors can actually give approximately the spark timing desired; in fact, they give maximum power spark advance at speeds where this does not cause detonation, and at lower speeds they give a retarded spark to allow for the knocking tendencies of commercial grade fuels. . . . What gain in power could be obtained if low speed knock did not require the spark to be retarded? To answer this question it was necessary to devise a method of averaging the loss in power that is suffered when the spark must be retarded, because the amount of retard depends upon the engine speed.

To expedite the calculation of the power loss necessary

(1) S.A.E. Journal Vol. 40, page 148-150.
S.A.E. Journal Vol. 43, page 436-440.

ON FOUR CONTINENTS



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CLAY TREATING

with fuels having various borderline knock curves, a special chart shown in Fig. 1 was constructed. This chart uses percentage power loss corresponding to a given number of degrees spark retard (from the timing giving maximum power) as the ordinate scale and car speed as the abscissa. Using a 69.5 octane number cracked fuel which gave high-speed knock, and a 70 octane number straight run fuel as examples, the difference in degrees spark timing between the incipient knock curve and the timing for maximum power was noted at 5 m.p.h. intervals for each fuel and plotted on the chart. The areas thus formed can be used as a measure of the power loss value of the fuels.

It will be noted from Fig. 1 that the power loss may occur at either high or low speed, depending on the type of fuel. Since it is impossible to distinguish between the importance of a loss in power at low speed and one at high speed, the best that can be done is to average the losses at all speeds. It is interesting to note that the power to be gained with these engines by the use of higher octane number fuels and the more advanced spark timing was only of the order of one per cent. The octane number required for maximum power was about 85.

Effect of Gasoline Type On Power Loss

Up to this point we have discussed the problem of meeting the spark timing requisites for power and freedom from knock on the basis of insensitive straight run reference fuels. In actual practice, however, most commercial motor fuels contain some cracked gasoline which causes their antiknock values to be sensitive to engine conditions, so the problem has to be reviewed to learn the influence of this additional factor.

The advantages of the fuels over matching reference fuels have been determined at 5 m.p.h. intervals as shown in Table 1. This appreciating tendency of cracked gasolines due to the different shapes of the highest useful spark advance curves must have some effect on the power loss obtained due to retarding the spark advance.

In calculating the average power loss for fuels of various types on the maximum which is obtainable, we can follow the same procedure as was followed for the reference fuel blends. Table 1 shows the average percentage power loss of cracked fuel compared with the reference fuel blends.

Table 1.
Average Power Loss On Cracked And Straight Run Gasolines

Fuel	A.S.T.M.	Average Power Loss, %	
Car G-37	Oct. No.	Cracked	Reference
1	70.0	1.2	1.6
2	71.0	1.3	1.4
3	68.4	.8	1.8
Car A-36			
4	71.1	0.2	1.4
5	69.1	.3	1.6
6	70.0	.6	1.5

No significance is attached ot the smaller loss with the cracked fuels in Car A-36 because fuels 4 to 6 were more sensitive than 1 to 3. It is significant, however, that the cracked fuels whose octane numbers were between 68.4 and 71.1 gave almost the maximum power of which the engine was capable. The losses on the straight run fuels, though still small, were about twice as great as those on the cracked gasolines.

Looking back on the whole problem for a moment, it has now been shown that the wide range of present day octane requirements is due to the flexibility in the adjustment of spark advance mechanisms and that reasonable adjustment of these mechanisms to take care of a fairly wide range of octane numbers has a relatively small effect on the performance of the engine. The questions still remaining, however, are: what are the effects of other variables such as changes in atmospheric conditions or engine design on this situation, and how can the information we now have be used to clear up the confusing situation regarding the correlation of "road octane numbers" and laboratory octane numbers?

Difference in Performance Under Other Conditions Using Fuels of Different Types

In the past it has been advantageous to study road performance in terms of "road octane numbers" in comparison with laboratory octane numbers. We now feel that it is undesirable to express car results in terms of road octane numbers and that greater flexibility is obtained if car performance is considered in terms of the advantage of the given sample over its equivalent ASTM reference fuel. That is, a certain cracked gasoline may match a 70 octane reference fuel in the laboratory engine, but in a given car under certain conditions it may be as good as a reference fuel of 80 octane number. We believe it is better to conceive of the cracked fuel as having an advantage of 10 octane number units over its 70 octane number reference fuel rather than a "road octane number" of 80. The advantage of this concept lies in the simplicity of comparing road tests in the same car under different driving conditions.

Use of this concept, coupled with the analysis of highest useful spark advance curves, also reveals why the "severity factor," as sometimes calculated from a number of ratings made at the speed of maximum knock, is variable, and, instead of being a fixed value for each make of engine, varies between wide limits. This is caused by the fact that the advantage of a cracked fuel over its straight run reference fuel varies greatly with speed so its apparent appreciation in terms of "road octane numbers" depends upon the speed at which maximum knock happens to occur, and which in turn depends upon the particular distributor used.

In actual practice, the distributor curve for a new car can be expected to fall anywhere within a band about four degrees wide, and after a time the band is known to widen considerably because of wear, burned distributor points, sticking governor weights, etc. Ratings that are obtained on a sensitive cracked fuel when matched against straight run reference fuels by the C.F.R. maximum knock method of test will be affected markedly by differences in the rate of advance of the distributor timing with different cars which cause the cracked fuel to reach its maximum knock at different speeds.

The knocking performance as determined by the aid of borderline knock curves, which are obtained without the use of the automatic advance mechanism, gives a more representative indication of the average result to be expected of all cars of a given make because, first, these curves themselves are reasonably reproducible, and, second, instead of basing the knocking tendency of the individual car on the particular spark timing calibration for that car, it is calculated from the manufacturer's specification of what the calibration should be for that car. The average calibration for all cars of that make can be expected to follow the manufacturer's curve very closely, so the antiknock performance thus measured on the one car can be relied upon to represent the average, even though that car may not have a representative distributor advance calibration.

It follows that not only the ratings, but also any other indications of car performance that are calculated from those ratings, such as car appreciating tendency and antiknock requirement, are more representative when obtained by the borderline knock method.

Effect Of Atmospheric Temperature On Appreciating Tendency

It has been shown that incipient knock curves provide a valuable tool for the study of the appreciating tendency of an engine. Appreciation is not constant but is a function of speed. Another factor of which the appreciation is a function is temperature, and in this respect atmospheric temperature plays an important part. Maximum knock ratings have shown to a certain extent the effect of temperature on the ratings of sensitive fuels, but the results have been masked by the effect of speed and have been very difficult to analyze. Now it will be realized that if the appreciating tendency were determined for an engine at various atmospheric temperatures, more definite information would be available. With this object in view, incipient knock curves were run on reference fuels and three gasolines of varying sensitivity at four temperatures from 25°F. to 100°F. on Cars A-36 and G-37. It was necessary to make these tests on a chassis dynamometer where the wide range of air temperatures de-

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sired could be obtained and the air temperature for any one series of tests held constant.

In general the data revealed that the appreciation is decreased greatly at temperatures above 50°F. and that the same general relationship is followed at all temperatures, of high appreciation at the lower speeds but depreciation at higher speeds.

From such data it was also possible to calculate the effect of spark timing on the power loss when the spark was retarded from maximum power timing at the different temperatures and with the different types of fuels. Table 2 shows examples of such data.

Table 2.
Average Loss In Power At Different Atmospheric Temperatures

	25° F.		50° F.		75° F.		100° F.	
Fuel	**Crkd.**	**St. Run**	**Crkd.**	**St. Run**	**Crkd.**	**St. Run**	**Crkd.**	**St. Run**
Average Loss In Power In Car G-37, %								
1	1.0	.9	.6	.7	.7	.8	.6	.8
2	.9	.8	.5	.6	.4	.7	.	.
3	.4	1.1	.3	.8	.3	1.0	.3	1.0
Average Power Loss In Car A-36, %								
4	.3	1.3	.4	1.0	.7	1.2	1.4	.7
5	.8	1.6	.3	1.2	1.0	1.5	.8	.9
6	1.2	1.5	.5	1.1	1.7	1.4	1.2	.8

The straight run fuels were given the advantage in a few cases, though in general the cracked fuels were slightly superior in both of these cars.

Regarding the changes in performance that occurred when the temperature was changed, it can be seen that sometimes the performance changed on the cracked fuels while that of the straight run remained the same, sometimes the straight run varied while the cracked fuels remained unchanged, and sometimes both varied in either the same or opposite directions. It is thus clear that relative values on a cracked gasoline, as are obtained by the use of road ratings, are unreliable as an indication of its road performance.

Effect Of Compression Ratio On Appreciating Tendency And Engine Performance

As a further interesting example of the use of the highest useful spark advance curves, the following experiments on the effect of compression ratio are worthy of note. In these experiments the highest useful spark advance curves on three fuels of widely different sensitivity were studied on the road on an L-head low priced car with a normal compression ratio of 6.7 and compared with similar curves on the same car but with compression ratios of 5.0, 5.7, and 7.85c, obtained by using additional gaskets or by milling off the surface of the cylinder head. It is realized that the use of the extra head gasket changes the surface volume ratio and also to some extent the shape of the combustion chamber.

The test fuels used were a 70 octane number reference fuel blend and two different cracked gasolines. These fuels had the following ASTM and research octane number values:

Fuel	A.S.T.M.	Research
7	70	70
8	70.8	79.4
9	70.1	75.9

The incipient knock spark timing curves for the fuels were run at full throttle acceleration on a hill, and the spark timing required for maximum power at each compression ratio was determined on the chassis dynamometer using a high octane fuel which did not detonate.

At 5.0 to 1 compression ratio the allowable spark timing on all fuels increased rapidly as the speed increased. This relationship changed gradually until at the high compression ratio of 7.85 to 1 the allowable spark timing increased very slowly as the speed increased. Although the ASTM octane numbers of the three fuels were about equal, fuel 8 allowed a much more advanced spark timing at 5.0 to 1 compression ratio. Even at 6.7 to 1 the cracked gasolines were considerably better in road antiknock value than the straight run reference gasoline, especially at low speeds. This is in line with results on other engines of about this compression ratio. However, at the high compression ratio of 7.85 to 1 the road antiknock values of the cracked gasolines dropped sharply and allowed less spark advance than the 70 octane number reference fuel blend at speeds above 23 m.p.h. The above results indicate that such fuels may be sensitive to pressure and that the antiknock values of these fuels may decrease with increasing pressure more rapidly than do those of straight run fuels. From a practical standpoint the data mean that the advantage new enjoyed by cracked fuels over straight run fuels may diminish if compression ratios of engines are increased materially.

The timing for maximum power at the various compression ratios is interesting and shows the need for automatic spark timing devices at low compression ratios. However, at high compression ratios the spark timing could be maintained constant at 13 degrees B.T.C. from 25 m.p.h. up without any appreciable loss of power. This may tend to justify the practice of foreign designs where fixed spark timing is used. In these cars of small displacement and high compression ratio, the speed of the engine is generally maintained high enough by gear changes to make a fixed spark practical.

Concluding Remarks

To sum up, while no claim is made for finality of our own data, it does seem as if with present day cars the wide range of octane requirement found in past surveys is due to flexibility of spark timing mechanisms and the loss in power obtained by adjusting the spark timing to suit a wide range of octane numbers is comparatively small. It also seems as if by changing the type of fuel, the highest useful spark advance curve is so changed that the power loss can be reduced to even smaller proportions.

At the beginning of this paper the development of the science of detonation was divided into phases, the first being one of experimentation, and the second, one of commercial standardization, and it was one of the main purposes of the paper to indicate a path through the woods to the third phase which, for the want of a better description, might be called "the period of more critical analysis." For this phase it is suggested that the methods of attack outlined in this paper, that is, the highest useful spark advance method of study, has definite advantages over the cooperative survey methods that have been followed during the second or commercial standardization phase.

If the future study is considered in this light, it seems possible that an engine could be designed whose spark advance required for maximum power would fall below the borderline knock curve on a commercial grade fuel at all speeds. If in addition the maximum power spark timing were not sensitive to speed, it might be possible to dispense with the automatic spark timing mechanism and use a fixed spark timing, with consequent elimination of many difficulties.

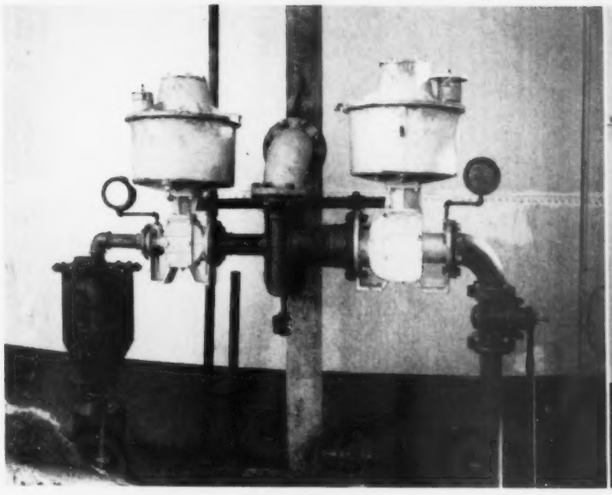
It might also be expected that the effect of combustion chamber deposits would be marked. (3) Some preliminary work in our laboratory has also indicated the importance of research in this direction and the excellent work of Messrs. Bartholomew (4) and Blackwood (5) has shown very clearly that mixture distribution is an outstandingly important phenomenon, and it is believed that the highest useful spark advance curves are worth studying on individual cylinders in a multi-cylinder engine by retarding the spark, say 5 to 10 degrees, in all cylinders except the one under investigation. It would seem that the various committees now studying the detonation phenomenon of automotive engines might well carry out some of this work in a cooperative manner and encourage various laboratories represented to carry out individual portions of this work on such items as appear promising.

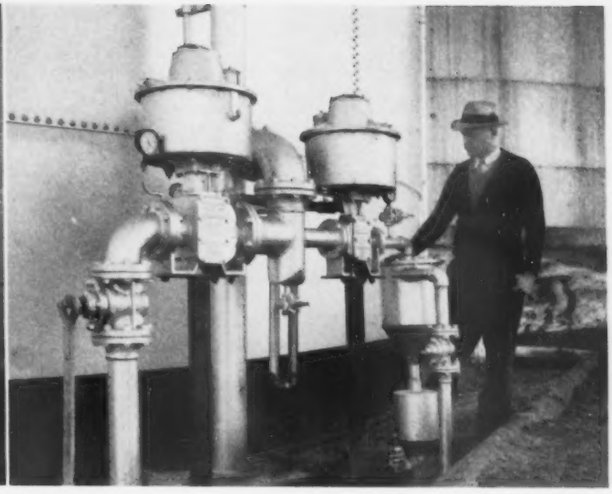
Acknowledgments

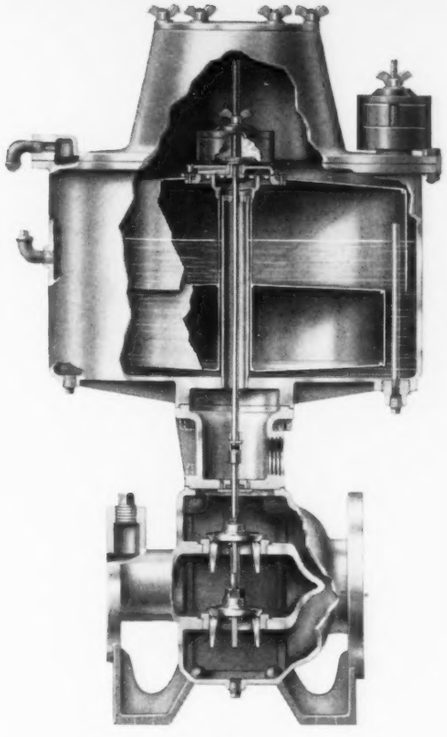
In conclusion the authors would like to acknowledge their debt to Mr. R. J. Greenshields and the staff of the Wood River Engine Research Laboratory of the Shell Petroleum Corporation who have carried out all the experimental work in connection with this paper, and to the management of the Shell Petroleum Corp. for permission to publish this material.

(3) S.A.E. Journal Vol. 43, pages 436-440.
(4) S.A.E. Journal, Vol. 42, pages 141-156, (1938).
(5) S.A.E. Journal, Vol. 43, pages 427-433, (1938).

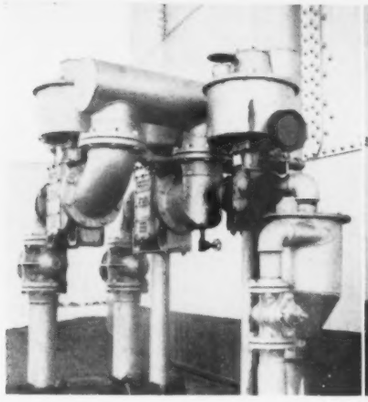
Dividends from the Air

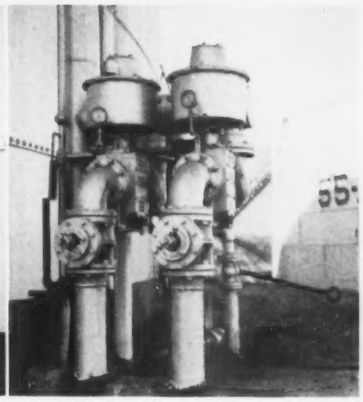






Sectional view, showing construction details of S. & J. Supersensitive Vapor Recovery Regulator.





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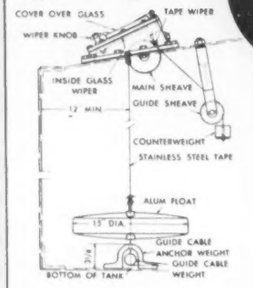

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D-2 To Discuss Gum, Sulfur, Lubricants at March Meet

Technical committee B on Lubricants of the A.S.T.M. contemplates sponsoring another round-table discussion at the June meeting in Atlantic City, similar to that held in 1938. As a result of two years of co-operative testing, the Gum Section of Technical Committee A on Gasoline, a draft of the bomb method for gum determination will be prepared and offered to Committee D-2 at the meeting in Washington, March 13-14. A discussion on sulfur determination by the lamp method will be held at the same meeting.

Redrafting Method B of the A.S.T.M. Test for Kinematic Viscosity (D 445-38T) so that it will apply both to the Fenske and the Zeitfuchs modifications of the Ostwald viscosimeter was decided on at the meeting of Committee D-2 in Detroit in January, the society announces. Several other changes in Standard test methods are indicated by the actions taken during that meeting.

The Ramsbottom method for Carbon Residue has been found equally satisfactory as compared to the Conradson Carbon Residue test, both as regards reproducibility and manipulation. Subcommittee XXIII on Carbon Residue is considering the recommendation of the Ramsbottom method as a tentative standard. At the same time the subcommittee on Sligh Oxidation voted to do no more work on that method, and to discharge the committee.

France May Build Hydro Plants

PARIS—Guarantee of loans up to 400,000,000 francs, to build hydrogenation plants in France has been authorized by the French Government. Up to 40% of the capital of companies formed to build these plants may be subscribed by the National Office of Liquid Fuels, according to the authorization made the last of January.

The announced purpose of this move is to insure France adequate supplies of motor fuel for national defense, especially for aviation fuels.

1939 A.S.T.M. Index Ready

The 1939 Index of A.S.T.M. Standard and Tentative Standard Test Methods is ready for distribution. Copies may be obtained without charge, upon written request to the Secretary of the American Society for Testing Materials, 260 So. Broad St., Philadelphia, Pa.

J. W. Poole Joins Lion Oil

John Ward Poole, petroleum technology consultant of New York, has joined the staff of Lion Oil Refining Co. of El Dorado, Kans., as assistant manager of manufacturing. A specialist in solvent refining methods, he has maintained offices in New York since 1936, and brings to his new position almost 20 years of specialized research experience in petroleum refining.

Following alternate periods of study at Massachusetts Institute of Technology and experience with Beacon Oil Co. and Pierce Oil Co. S. A., Mr. Poole spent four years in research at M.I.T., and later carried out research work with Foster Wheeler Corp. on solvent refining processes for another four years.

CLEVELAND—Julius von Braun, famous German chemist and authority on naphthenic acids in petroleum, died in Heidelberg early in January, 1939. He is best known in America probably for his work in isolating naphthenic acids. Several years ago he isolated and identified 3,3,5-cyclopentylacetic acid, the first of these acids of known structure to be reported.

He was professor of organic chemistry at the University of Breslau in earlier years, later holding the same position at the University of Frankfurt. At the time of his death he was director of a private laboratory in Heidelberg.

Engineers Forecast Future Trends In Asphalt Paving Industry

N. F. McCoy of San Francisco, senior highway engineer of the U. S. Bureau of Public Roads, and Prevost Hubbard, chemical engineer of the Asphalt Institute, presented a joint paper before the 12th annual meeting of the Asphalt Institute at Los Angeles, Feb. 27-March 3.

The paper carried the title "Review, Analysis and Forecast." It reported that current technical literature on asphalt and asphaltic pavements reveals a "stimulating quality of originality, of inquiring into the reason and justification of precedent-honored practices, in other words, a true research attitude to the end that the public's road money will be used effectively."

The authors said investigations were being made regarding quality or durability tests for asphalt and that such tests are the result of field observations which indicated certain products became hard and brittle in service and decrease progressively in usefulness to the point that a pavement ravels or fails.

Many problems still exist and some arguments are still alive, despite effective work of the joint technical committee on liquid asphalt specifications, the authors said. No satisfactory quality test for asphalt is available yet they remarked, pointing to the misconception that the Oliensis test was a "quality test". Although it does distinguish between cracked and uncracked asphalts, some cracked products had been found satisfactory. A further test distinguishing between unsatisfactory and satisfactory cracked asphalts was declared needed. The need for research on this point was indicated.

This paper brought out the need for a test to determine the "setting qualities of liquid asphaltic materials, and declared that another problem of immediate interest to many users of asphalt was that of the water-asphalt preferences of various aggregates used in road construction. This latter problem is still in the laboratory stage, although progress is being made and some of the laboratory findings successfully used.

From a review of current criticisms of the behavior of some asphalt roads, and from consideration of the subject matter of current research, the authors forecast several future trends in the asphalt paving industry:

"First, there seems to be little doubt that the utilization of local aggregates for both foundation and surface courses, already established practice in many states, will increase. Developments in soils science and discoveries regarding the chemical reactions between asphalt and mineral will accelerate the tendency to rely upon local mineral deposits.

"Practical economical pretreatment methods, combined possibly with the use of energized asphalts can be expected to permit the use of minerals now considered unsuitable. One can readily visualize the revolutionary effect of possible discoveries along that line.

"Numerous reports on the excessive hardening of asphalts after a few years service permit one prophecy without resort to the imagination, namely that softer asphalt cement will be used for 'high type' paving, and that cutbacks with somewhat softer residues may be demanded for low cost roads.

"There is even now a discernable tendency to substitute the more viscous slow curing liquid asphalts for cutback asphalts in certain types of work. Both dense and open-graded plant mixes using an extremely soft asphalt cement known in the Western States as SC-6 liquid asphalt have been built recently by Western State and Fedral authorities that were using cutbacks for that purpose two or three years ago.

"Finally, laboratory control of bituminous surfacings will be more positive. Tests of the various combinations of asphalt and minerals that will be used, devised to simulate field conditions, and correlated with service results are very revealing. Highway engineers are now using tests formulated along those lines, and competent research men are constantly bettering them. That type of test and the type of intelligence that devises and perfects such tests bridge the proverbial gulf between the laboratory and the field viewpoint, and in the end will eliminate guesswork from asphalt surfacing construction.

Dr. Ulric B. Bray, general research supervisor, Union Oil Co., in a discussion following this paper told the delegates of a modified Oliensis test developed on the West Coast for distinguishing between cracked and uncracked asphalts. He said some California crudes resemble those found in Mexico and may show a positive Oliensis test even though not cracked.

The modified test, Bray said, uses solutions of Heptane and Xylene in determining asphalt properties. Results are shown by a Xylene Equivalent, which is the amount of Xylene required to be added to Heptane to make the asphalt give a negative spot test. A 35 Xylene Equivalent would be 35 volumes of this product to 65 volumes of Heptane.

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American Standards Ass'n. Will Develop Aviation Standards

Co-operative plans for development of standards for equipment and materials for the American aeronautical industry have been made by ten organizations in collaboration with the American Standards Association. A committee representing the co-operating organizations will probably be formed. The conference which developed the plans has recommended that this committee work under the technical leadership of the Society of Automotive Engineers, the pioneer for years in industrial standard building for the airplane field. The work will include standard aviation fuel specifications.

The work will be international in scope, with the expectation that eventually standard specifications of parts for airplanes will permit replacement of any part of a plane, made in any co-operating country, by parts constructed in any other country where it is needed. Many American planes are being bought for service abroad, and foreign users are urging American manufacturers to use parts interchangeable with similar parts made in foreign countries, to simplify maintenance.

A meeting of representatives of the International Standards Association, of which the American organization is a part, will probably be held in New York in May, the week before the World Automotive Congress convenes, May 22-28. The international body includes representatives from 26 countries.

The organizations taking part in this work are: Aeronautical Chamber of Commerce, Air Transport Association of America, American Petroleum Institute, American Society for Testing Materials, Civil Aeronautics Authority, Cooperative Fuel Research, National Advisory Committee on Aeronautics, Society of Automotive Engineers, U. S. Army, and U. S. Navy.

1000 More Diesel Vehicles in England

Significant figures for the oil refiner and the diesel engine builder are reported from England on the increasing rate of adoption of diesel power for heavy vehicles. The Traffic Commissioners of Great Britain report that 7643 diesel powered public service vehicles—buses, etc.—were licensed in England for the year ending March 31, 1938, as compared to 6698 of the same type during 1937. Several reports were yet to be received for 1938 when these figures were compiled, so it is likely the total for 1938 will be increased. These figures do not include privately owned vehicles using diesel engines.

Metering Lighter Hydrocarbons

A proving procedure which will enable adoption of positive displacement meters to measure natural gasoline in sales and transfers is described in a new bulletin announced by President H. R. Linhoff of the California Natural Gasoline Association. The natural gasoline industry has been reluctant to adopt this method of measurement because of the lack of an adequate, quick and reliable method of testing the accuracy of these meters in service, it is said.

"The use of metering can facilitate the handling of natural gasoline and in some cases may promote greater safety and reduce the investment in gauging tanks by decreasing the plant storage requirements, permitting the gasoline to be shipped as rapidly as it accumulates," the preface states.

The new bulletin (TS-381) describes a "Tentative Standard Method for Proving Positive Displacement Meters to Measure Natural Gasoline." It was prepared by the Technical committee under the chairmanship of C. D. Gard. Price of the bulletin to non-members is $1.50. Requests should be addressed to G. L. Taylor, 510 W. 6th St., Los Angeles.

F. J. McGovern has opened a new office for the Lummus Co., engineers and contractors, in Chicago, at 600 S. Michigan Ave. McGovern began his oil industry career in 1920 in Tampico, Mexico, and has had a wide and varied engineering experience since that time—Blank & Stoller Photo.

Annual Review Of Petroleum Technology (1937)

The momentous developments in cracking technology are treated exhaustively by Dr. Gustav Egloff and collaborators in the "Annual Reviews of Petroleum Technology" for 1937, published by the Institute of Petroleum, of England. Regional Geology is treated in this issue in two divisions, the United States in one, and the remainder of the oil-producing world in the second.

New chapters have been added; one on "Production Engineering", by G. H. Scott, and one on "Aero Engines" by H. S. Glyde. These added chapters show the increasing importance of these new branches of the industry. Twenty-seven chapters make up the volume, covering geology, production and geophysics, drilling, transportation, chemical and physical refining, motor, aero and diesel fuels, lubrication and special products, and especially interesting are the chapters on "Hydrogenation and Synthetic Fuels", and "Low- and Medium-Temperature Carbonization, etc." Petroleum Literature of 1937 is reviewed comprehensively in one chapter by Winifred S. E. Clarke.

Corrosion and 'Varnish' Are Brothers under the Skin

By Arch L. Foster
N. P. N. Technical Editor

That corrosion of bearings and the deposition of the so-called "varnish" in automotive engines under certain conditions are closely allied problems, both due to the temperatures reached in recent years, was brought out in a debate on motor oils and engines, at a recent meeting of the New York chapter of the Society of Automotive Engineers.

The results of tests were presented which showed the effect on bearings of various oils and operating temperatures and brought out that the use of certain oils and bearings may not result in corrosion but will still cause "varnish" and engine sticking.

This article is an amplification of the discussion appearing in earlier issues of NATIONAL PETROLEUM NEWS on the difficulties encountered in the high speed operation of modern cars. These articles, appearing in the Jan. 25th and Feb. 22nd issues, dwelt mainly on the "varnish" problem. Many oil companies have written in for reprints of the Feb. 22nd article particularly and reprints are still available. Prices in lots of 100 or over on request. NATIONAL PETROLEUM NEWS, Cleveland.

THE fact that the cause of today's "varnish" problem and yesterday's automotive engine bearing problem are essentially the same became clear at a meeting of the Society of Automotive Engineers, metropolitan section, at New York March 9.

High motor temperatures of a few years ago caused the motor makers largely to abandon "hard alloy" bearings such as copper-lead and silver-cadmium. The high temperatures at that time caused acid in the crankcase and the bearings failed.

Today high motor temperatures are causing motor oil oxidation and "varnish" deposition.

Motor makers may want to go back to their old "hard" bearings. If they do they think they will not have as much trouble as before with corrosion because better bearings are being developed. With the use of Indium, a new metal, hard alloy bearings will not corrode. Unfortunately, however, this metal costs $450 per pound. Solution of the allied "varnish" problem depends largely on lower automotive temperatures, it was brought out at this meeting.

Intense interest of the oil and automotive industries in corrosion and "varnish" was shown at the meeting, when more than 200 turned out to hear papers by F. L. Miller of New York, lubrication engineer for Standard Oil Development Co. (Standard of New Jersey research organization) and A. F. Underwood of Detroit, of the research department of General Motors at Detroit.

Overshadowing all other factors is that of the operating temperature of the engine at which the engine oil must function. Three conditions must all be "right" before a bearing can be corroded or "varnish" formed, these engineers pointed out. The engine temperature must be high enough to produce acidic, corrosive products in the oil. Bearing metals must be corrodible by these products. The engine must be so designed that the temperatures are reached which produce acids. Eliminate any one of these factors and corrosion of bearing metals is eliminated.

Reduction of engine operating temperatures by design changes is the first angle of the problem to be solved, a matter which is up to the engine designer, these speakers showed. Higher and higher engine speeds promote higher crankcase temperatures. The range of temperature between no acid formation and severe acid formation is relatively narrow. That band of temperature has been reached in some modern engines during the last four years especially. Keep the temperatures below that range and the engineer can use any bearing metal he wants. Then the oil refiner can produce most any oil he wants and no trouble comes so far as serious corrosion and "varnish" troubles are concerned, they said.

The troublesome range of temperature begins around 250-275 degrees Fahr. These temperatures are reached in the higher sustained speed ranges, usually of 60 m.p.h. or higher. In that range some oils begin to corrode bearings. Some do not corrode but may deposit "varnish", even stick the engine pistons and bearings and stop operation. In one case Miller reported tests on a 1935 car the engine of which was notorious for its high oil temperature. At 70 miles per hour the oil in this engine showed an oil temperature of 336 degrees Fahr., and cadmium alloy bearings were corroded severely in driving 245 miles. The same make of car, 1936 model, showed an oil temperature of 286 degrees Fahr., and the same bearings failed at 448 miles of driving. On the same test two other cars were driven 2500 miles each on the same oil, oil temperatures were 228 and 233 degrees Fahr., and no bearing failures resulted; the weight loss of the bearings in these two cars was barely measurable. Oil pressure drops rapidly when corrosion begins, a measure of the progress of corrosion.

Comparatively small changes in car speed (engine speed), may make the difference between no corrosion and bearing failure, Miller showed. With cadmium silver bearings, a 1936 engine was driven at 3500 r.p.m., equal to 66.5 miles per hour, on two different oils. Each oil was used for 1330 miles before bearing failure, with oil temperatures between 280 and 290 degrees Fahr. Boosting the speed to 3900 r.p.m., (74 m.p.h.), only 7.5 miles per hour faster, the temperature jumped only to 290 degrees Fahr., but the corrosion destroyed the bearing surfaces in 330 miles.

Some bearing metals will corrode severely with some oils, while a change of either bearing metal or oil was found to obviate the trouble instantly. For example; two oils were tested in two engines with two kinds of bearing metals. In each case the silver-cadmium bearings "went out"

quickly, at 245 and 330 miles respectively on the two oils. In this specific case copper-lead bearings ran 2220 and 2369 miles before they failed. In other cases the order is reversed, and the lead from these bearings has been removed in a few miles.

Engineers have been showing how closer clearances have reduced oil consumption, and promoted longer oil life, more oxidation. To investigate this angle of the problem, and to see what relationship may exist between oil life, oil consumption and bearing failure, a new car was run on a given oil until the cadmium-silver bearings failed from corrosion and wear. The first run ruined the bearings in 370 miles, on the new car. After the engine had been run 4070 miles, starting with new bearings it required only 302 miles to bring bearing failure. At 8000 miles on the car, new bearings lasted for 889 miles. When the engine had gone 18,500 miles, it required 1610 miles of driving to cause failure of new bearings. During this period the oil consumption increased, indicating that, as clearances increased the oil consumption increased, the corrosion is lessened, and bearings last longer. All this driving was at 74 m.p.h., more severe than the average passenger car is normally subjected to in service.

Again, the use of an oil-bearing combination may not result in corrosion at all, but "varnish" deposits and engine sticking may cause operating failure. In a series of tests on several engines and oils at 70 m.p.h., the bearings failed at as low as 245 and 280 miles. Other oils did not cause failure at all, but in two cases the tests were stopped short of the predetermined distances because of oil thickening, "varnish" formation and sticking of parts.

Oxidation inhibitors have in many cases permitted the use of oils without corrosion or "varnish" formation, Miller showed. Other observers agreed with this statement, but pointed out that at the above maximum temperatures, even these inhibitors were ineffective, and were palliatives at best. One technologist stated that in his laboratory he had found that, generally speaking, temperatures of 280 degrees Fahr. in the crankcase oil showed very slight corrosion effects. At 300 degrees Fahr., corrosion was serious and shortened bearing life remarkably, while at 320 degrees Fahr., the corrosion was so severe as to make operation under such conditions entirely impractical with most alloy bearings and oils. Another investigator found that somewhat higher temperatures were permissible in his operations, but that about 350 degrees Fahr. was above the maximum permissible limit for oil temperatures.

In any case the border range of temperatures between no corrosion and too severe corrosion is narrow, these engineers have found. Modern engines have been so designed for higher speeds and power outputs that this border range has been reached and in some cases exceeded, producing corrosion, or serious varnish deposition, sticking of rings, pistons, scoring and corroding of wrist-pin bearings with the result that the solution of the difficulties was forced on the engineers.

One of the greatest problems in the use of copper-lead bearings has been their corrosion, with the resultant removal of the lead which is the antifriction component, by oleic and other fatty acid additives, or naphthenic or similar acids formed in the oil in service. A. F. Underwood of General Motors, showed how the bearing designer has tried tin, antimony, calcium, mercury and other alloying metals to reduce the corrosion-tendencies of the lead. Tin, when added to the copper-lead mix — copper and lead do not alloy, but are merely intimately mixed —combines or alloys with the copper forming brass, scoring the journal without aiding the lead at all. A tin plating over the copper-lead surface soon wears off and the condition is as bad as before.

The solution of the problem seems to lie in the use of the rare metal indium, a metal costing a mere $450 per pound, it was brought out at the meeting. With cadmium alloys indium forms a corrosion-resistant bearing which will stand up against acid-forming oils. If the oil forms no acid, the cadmium bearing will stand up of course without indium, only a few tenths of one per cent of which is used in any case, where used at all.

Indium does not form a non-corrosive alloy with lead, but as a plating has given good results, Underwood reported.

The bearings of the future will carry loads up to 5000 pounds per square inch, Underwood reported, although such loads not commercially practicable now. The whole bearing problem outlook is more favorable than ever, he said; meanwhile, in using unalloyed lead in bearings, non-acid-forming oils must be used. With acid-forming oils, the cadmium-indium combination is satisfactory although expensive, he stated.

New Diesel Lube Oil By California Standard

SAN FRANCISCO — Standard Oil Co. of California has announced a new "RPM" diesel lubricating oil, replacing its older "model" RPM oil brought out three years ago. This oil has been developed by an extensive research program, during which some ten million test miles were run, occupying 90,000 test hours.

The new Delo oil, as it is called, is recommended for use in engines fitted with copper-lead, cadmium-silver, Satco and other types of hard-alloy bearings. The older RMP oil was recommended for use with babbitt-type bearings but not for the newer bearing metals.

The compounding material is said to be a strong anti-oxidant, preventing the formation of acids which might corrode new type bearings. In addition it has high "film strength" properties which reduce wear and maintain adequate lubrication under excessive bearing surface pressures such as exist in any high-speed diesel engine Standard says. The new Delo oil is especially recommended for break-in as well as regular service.

'Unsalting' Cars in the Springtime Is Talking Point for Wash and Lube Jobs

Spring showers give the station operator a good talking point to sell his customers a wash and polish job, plus a complete lubrication.

Here's how:

During the winter season large quantities of calcium chloride or salt are sprinkled on roads and streets to lessen the driving hazard of sleet and ice. Spring rains stir up the accumulation of grime and salts, automobiles splashing it over each other (and pedestrians, too—but that's for the cleaners to take care of).

The grime makes the cars unsightly, but the salts attack the paint, chromium (where there is the least crack), the exposed parts of the chassis, steering gear and brake connections. In time, the salt unless removed will eat into the surfaces and may cause friction metals to stick. Controls will be handicapped by the corroding influence of salt sprayed in by passing cars.

"Unsalting" the automobile exposed to wintry streets should be done periodically through the cold season, but it becomes a highly important and necessary process in the springtime.

Service departments of car manufacturers point out that "unsalting" can be conveniently done by spraying the car, above and below, with plenty of water to loosen and carry off the salts along with the grime and mud splashings. After a thorough over-and-under washing, including all connections and other controls to which the salts may have penetrated, the chassis should be completely lubricated, and the body gone over with a polish that will leave a protective film on the finished surfaces.

There, is the germ of a saies talk for the station to sell a wash, polish and lubrication job. The grimy appearance of cars which have come through the winter season is a strong point, but it can be climaxed with the additional factor of "unsalting."

Cutting crude costs

Crude oil is the refiner's biggest expense

Gasoline is his best seller—if it's good gasoline

Fuel oil is a drug on the market and a drag on his bank roll—it costs money to store it

To cut crude costs, make more and better gasoline and less fuel oil from every barrel you run

Dubbscracking is the way to do it

And the U. O. P. catalytic poly process converts even the cracked gases into still more gasoline of higher octane rating

U. O. P. coking converts the fuel oil you can't sell into coke that usually commands a good market

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

W.P.R.A. Keeps Pace With Changes in Industry

Rapid developments in refining technology today are demanding more attention and time than the smaller refiner can spare, so the Western Petroleum Refiners Assn. has decided to watch more closely this ever-changing picture and keep its members advised.

Thus, the W.P.R.A. has demonstrated—as so frequently in its 27-year history—its ability to keep up with the times.

Milestones of the association's achievements include its pioneering of octane ratings as a yardstick for anti-knock qualities of motor fuels, development of other specifications which have become standard with many state and federal authorities as well as the industry, co-operation in motor fuel and lubricant research, compilation and economic analysis of statistics, and legislative and tax work.

Here is told, compactly, the history of the W.P.R.A. meeting this week in San Antonio.

Clyde M. Boggs, who completes this week his fourth year as president of the Western Petroleum Refiners Ass'n. is truly one of the Mid-Continent's pioneer oil men.

He entered the producing end of the industry in Pennsylvania "way back when" and followed the westward movement through Ohio and down into Oklahoma and Kansas, being at various times a producer, a driller and a drilling contractor.

It was back in 1909 that Mr. Boggs moved to Arkansas City, Kan., after several years as a producer in Oklahoma and Kansas, and became vice president and general manager of the Kanotex Refining Co., with production his particular forte.

When the W.P.R.A. was formed late in 1912, the Kanotex company was one of the 19 charter members, and, with the National Refining Co., constitutes the only two still retaining their identity.

In 1929, Boggs became president of the Kanotex company and has made of it one of the outstanding independent refining companies in the entire country.

It was fitting, therefore, that in 1935 the W.P.R.A. directors named him president, then re-elected him for a second term in 1936 and again in 1937 and 1938 despite his declaration that he had had the honor sufficiently long.

SAN ANTONIO, Tex.—The Western Petroleum Refiners Assn., throughout its 27 years, has been outstanding among trade associations because of its ability to adapt its services to the changing needs of its members.

This ability has lifted this association from the ranks of trade organizations usually formed for a specific purpose and which drift out of the picture once that purpose has been accomplished.

Because of this ability, too, the association has enjoyed continuous, active life since its formation back in 1912 until today it is the second oldest oil association in the United States.

The directors of the W.P.R.A., following the custom established at the very first annual meeting, have once more canvassed thoroughly the current needs of its members, completing the task at the meeting here.

The directors have decided that probably at no other time in the history of refining has there been a more pressing need for its members to keep abreast of the rapid and revolutionary changes in refining technology, with its certain aftermath of changes in specifications.

They have decided also that the world situation, with its war clouds, calls for a continued close watch on the statistical position of the industry in general and on that part of the picture in which its members have a place.

Finally, the directors have decided that the association must continue to watch carefully the trends in legislation affecting the oil industry.

The association's activities during its 28th year, therefore, appear destined to be focused predominantly on technical, statistical and legislative matters of interest to its members.

The ability of the association to adapt its work to the current needs of its members can be traced through its entire history from its first formal meeting on Dec. 18, 1912 at Kansas City.

Twenty three executives of 19 refining companies attended that first meeting. The identities of all but two of those 19 companies have been lost in the ensuing years. They are the Kanotex Refining Co., at Arkansas City, Kan., and the National Refining Co., Coffeyville, Kan.

One of their first needs, organizers of the association decided, was information on current developments and a serious study of the economics of petroleum. The association accordingly became a meeting ground for the independent refiners in Oklahoma, Kansas, Arkansas, Louisiana, north, central, east and west Texas.

It was not long before the annual meetings were too far apart for the members to keep up their studies. District meetings at one or two months intervals were started and these meetings provided informal and open-forum discussions.

The association originated and pioneered the type of fundamental examination of the industry's condition and trends in such common use today.

These analyses were first started in the belief that the statistics then being gathered by governmental and other agencies were not being given the specific consideration and application by refiners in the districts making up the whole statistical picture. The association began gathering supplemental statistics and interpreting them for its members.

It must be kept in mind that back in the early days of the association the

"art" of refining consisted primarily of putting quantities of crude oil in "batch" stills and boiling off the various fractions. The art of refining was confined primarily to mechanical engineering. Refining technology as it is known today was not in the picture then.

There came a time, however, when chemical engineering began to play a larger part in the art of refining.

The association foresaw that trend and promptly took steps to serve its members. It undertook to gather all the data available and to bring it to the attention of the smaller refiners who were not equipped with the manpower nor the finances to keep pace, as individuals, with the strides being made by the stronger companies. The association helped these smaller refiners keep pace with their stronger competitors by enabling them to find out how to improve their products to meet competition, and eventually to pass the savings which accrued from these refining improvements on to their customers.

It was not until seven years after the association was formed that the first state tax was imposed on gasoline. Other states were quick to discover how easy it was to tax motor fuel. It became necessary to set up specifications in order to tie the tax to the proper refined product.

The W.P.R.A. swung into action. Some states, usually those having no refining activities, attempted to write specifications for motor fuel based wholly on illogical reasoning. The association frequently succeeded in bringing sanity to these legislative proposals and eventually became known as the one organization that could and would furnish expert counsel.

Then came the trend toward state and federal specifications for other petroleum products. The association once again adapted its services to the needs of its members. It not only assisted in the drafting of these specifications, but through its own committees wrote specifications which have become standards in many states and, in some instances, adopted by the federal government.

The growing list of specifications and the many laws pertaining to oil resulted in the association undertaking the task of preparing and keeping up-to-date a digest of state laws pertaining to petroleum products. This digest is now a ready reference book throughout the industry.

There came a time when it was necessary for the Mid-Continent refiners to battle for equitable freight rates. The association established a sizeable traffic bureau and was one of the leaders in that fight. After the battle was over there was no longer a need for this service and the traffic activities were suspended.

Late in the 1920's the art of refining had improved to the point where it became necessary to set standards for motor fuel. The association undertook this task, and pioneered the octane standards now generally accepted by the industry.

Then came the increase in the use of diesel engines, and the development of new tractor fuels. The association quickly foresaw the trend among farming states to attempt a tax on these so-called diesel fuels. Specifications were prepared for fuels that would be taxable and for those that should not be taxable. These specifications have been adopted by a large number of states and written into their motor fuel tax laws.

The rapid developments of cracking introduced greater hazards in refining. The association undertook a study of this problem, with the result that there was issued a code of uniform minimum requirements for inspection of cracking plants.

Then came the days of the NRA. Once more the association adapted its services to the needs of its members.

The late Howard Bennette, the association's president at that time, packed his bag and virtually moved to Washington. Day and night he was on guard, protecting the smaller independent refiners and their interests in all the hectic activities of those days.

From the engineering department of the Frisco railway, John C. Day stepped into the engineering department of an oil refining company in the Mid-Continent several years ago.

Born in Missouri, Day attended Drury College and Columbia University before joining the Frisco's engineering staff. His first oil company connection was with the former Waite Phillips Oil Co., which later was sold by its owner to become a part of the Barnsdall Oil Corp.

Day remained with the Barnsdall organization as assistant to the vice president in charge of manufacturing until the days of the NRA when he got into refinery allocation work under the oil code.

In 1935, he joined the Western Petroleum Refiners Assn. as economist and statistician when that organization resumed its statistical work following the close of the code activities.

Day also had charge of the technical activities of the association and has had charge of the programs for the regional technical meetings for plant operators and for the annual technical meetings.

When A. V. Bourque resigned Feb. 28 as secretary and treasurer of the association Day was named temporary secretary and treasurer by the executive committee.

Nearly nine years ago Mary Sue Collins left her native Texas and established her residence in Tulsa to become secretary to the W.P.R.A.'s then managing director, the late Howard Bennette. She had left a position with the American Refining Properties at Wichita Falls, Tex., which she had held for about 18 months.

Miss Collins brought to her new post, however, a background of education which fitted her admirably for the position. She had whirled through the University of Texas for a bachelor of arts degree, picking up along the way a Phi Beta Kappa key. Then she turned right around and obtained from the same university her master's degree in business administration, with statistics as her major subject.

Then followed a fling at post graduate work, one of the institutions being the University of Mexico at Mexico City. And after coming to Tulsa she had been awarded a certificate from the Oklahoma School of Accountancy.

When Howard Bennette virtually moved to Washington in the NRA and the P. & C. Committee days, Miss Collins packed the necessary files of the association and went along to run the W.P.R.A.'s Washington offices. Thus she was in the thick of the fast-moving happenings of those hectic days.

When A. V. Bourque was named secretary-treasurer of the association in 1935 Miss Collins was named assistant treasurer. In addition to her secretarial duties she has had charge of the routine work connected with the association's statistical studies.

When a national allocator of refining was needed Bennette was selected. In the councils pertaining to the code, Bennette and the executives of the association's member companies, were a potent force.

During the life of the NIRA the Planning & Coordinating Committee, and other agencies administering the oil code, gathered statistics on a large scale. The W.P.R.A. accordingly suspended its statistical work, realizing that it would merely be duplication of the wo . being done so thoroughly in Washington.

After the code days, however, the association saw the need for a resumption of its statistical work, and that was undertaken once more. In the coming year even greater emphasis will be laid on that activity.

Refining technology began making more rapid strides early in the 1930's and the association began to place more emphasis on its technical activities. There eventually was developed the now well-known series of regional technical meetings, held each fall in refining centers so that plant operators could attend. These programs were designed primarily for the plant operators and the speakers brought to these meetings the latest developments in the refining art. Then from these regional meetings were selected the most outstanding developments for presentation at the technical sessions which eventually were included in the annual meeting programs.

The association has had for many years, meanwhile, representation on all of the important automotive, lubrication, and refining committees. It has assisted other organizations in making extensive studies of specific problems. There was the study, for example, of vapor losses from fuel systems of modern automobiles, which was conducted two years ago under the joint auspices of the Natural Gasoline Assn. of America and the W.P.R.A. Those studies, now known as the Pawhuska road tests, provided data that already have led to several changes in the fuel systems of new automobiles.

The roster of the association's presidents and secretaries is composed of men who have been outstanding figures in the southwest's refining industry. W. H. Isom of the old Cudahy Refining Co. was first president. In order of succession they were D. W. Moffitt, H. G. James, E. E. Shoek, Pat Malloy, W. D. Richardson, G. N. Moore, F. A. Pielsticker, P. M. Miskell, Roy B. Jones, L. R. Crawford, George D. Locke, Howard Bennette and Clyde M. Boggs.

C. F. Martin of the old Chelsea Refining Co. was secretary and treasurer, serving on a voluntary basis, from the association's organization until Aug. 1, 1914. Horace G. James was the first paid secretary. Robert L. Welch succeeded James, then came Fred W. Lehman, John D. Reynolds, Howard Bennette and A. V. Bourque.

Jobber Praises Dealers

In NPN's Debate on 'Iowa Plan'

Any reader can join in NPN's debate on "Should the independent jobber take back and operate directly his leased stations." The debate was launched with Editor Platt's article in the Feb. 15th issue. Letters from readers giving their views are published herewith. Others appeared in the issues of March 1st, 8th and 15th; more will be published in subsequent issues.

CLEVELAND—This week's crop of readers' letters, published in NPN's debate on leased stations, presents one northern Michigan jobber staunchly defending the Iowa Plan, a company salesman citing arguments for company operation of stations, and a New England jobber who feels that companies should take back their stations but operate them on a "realistic" basis.

George C. Newton, Iron Mountain, Mich., treasurer of Lake States Oil Co., defends leasing out of stations and presents what he believes are points overlooked by other readers who have criticized the Iowa Plan. Newton, who is a civil engineer as well as member of the American Institute of Mining and Metallurgical Engineers, congratulates petroleum retailers on their "exceedingly creditable" record under the Iowa Plan.

With little to say about leased stations, H. W. Dodge, Milwaukee, in his letter presents affirmatively the case for company operation of stations.

The third letter comes from Edward W. Gould, Jr., Cape Cod Oil Co., Hyannis, Mass., who urges that the major companies take back and operate their stations on a basis that would yield them a "profit" on the marketing end of their business. He also criticizes marketing practices of some companies.

* * *

By George C. Newton, treasurer
Lakes States Oil Co.
Iron Mountain, Mich.

"Referring to the current roundtable discussion in NATIONAL PETROLEUM NEWS as to the merit of leasing out of petroleum retail stations to secure independent operation of same with a free retail market and without major oil company, or other interference as to retail prices, we have been very much interested in the discussion to date. It seems to us that the issues have not been clearly enough stated, nor perhaps discussed from a logical and economic viewpoint as fully as should be the case with so important a question. Because petroleum retailing is a very large and important business and covers a widespread territory wherein there are many variations in conditions, in submitting our viewpoint we have in mind particularly conditions throughout Northern Wisconsin and Northern Michigan, although we are rather familiar with marketing conditions in other areas as well.

"When our company was organized in the early part of 1933, it was our belief that the only successful operation of a petroleum retail station was by an independent owner, or by an independent operator who in either case was running his business enterprise on an entirely independent basis just as is the case with most other successful business operations. What we have seen in the past six years has more than confirmed our original viewpoint.

"When we started in the oil business with the policy of wholesale distribution of petroleum products only, experienced oil men told us that we were making a mistake and that what we should do was to build, own and operate a string of stations, just as chain stores are handled, rather than to carry out our plan to confine ourselves to wholesale distribution.

"Considered solely from the economic side, we have rarely seen a successful operation of a petroleum retail station on the chain store basis. (i.e., under major oil company ownership and operation.) It is true that we have seen wonderful service given the public by many such stations and we have seen very elaborate stations built which were often monuments in more than one way, and which might outwardly give the impression of being successful operations. Quite obviously such stations were operating in the red and it is our belief that no business operation is successful unless it is sound economically and can generally yield a profit. We consider the giving of satisfactory service and selling of high quality products as a necessary incident to any petroleum retail operation but not as primary evidence that the operation is successful.

"When the so-called Iowa plan was initiated by, we believe, a leading major oil company, we felt this to be striking confirmation of our policies and belief, and a long step ahead toward sound economic policies in the retailing of petroleum products. The Iowa Plan was very generally followed throughout much of this country and we believe, has done much to improve marketing conditions.

"Most of the criticisms of Iowa

You put your REPUTATION into every drum you ship...

● Your reputation goes with your product in every drum you ship. And whether that reputation is enhanced or damaged depends on whether the same quality and quantity you put into a drum is *delivered.*

You can make *sure* that your customers receive full measure and full quality by protecting your drums with "Tri-Sure". "Tri-Sure" Closure Seals are positively leak-proof—they can't be removed without deliberately destroying them. This means that every drop of your product is protected from waste, pilferage and substitution. It means that every shipment is a *safe* shipment—safe for your product and your prestige.

AMERICAN FLANGE & MFG. CO. INC.
30 Rockefeller Plaza, New York

Tri-Sure
DRUM CLOSURES

Make Every Shipment a Safe Shipment

Plan which have appeared in this roundtable discussion here and elsewhere have their origin more in conditions and factors which preceded the Iowa Plan. In other words, lease rentals may not be expected to yield a profitable return on the original investment when the original investment was unsound, which for purposes of this discussion may generally be considered to be stations whose cost was unwarranted in amount, or were poor in location. If the oil companies which originally built such stations could not operate them on a profitable basis direct, how can it be expected that lessees can come along and correct the initial mistakes of oil Company owners even though the lessees have certain inherent advantages in the economical operation of petroleum retail stations?

"It should be apparent that you cannot give the public more than it pays for even though many major oil companies have apparently thought otherwise as to their own retail marketing divisions and their own cost sheets indicate and confirm the unsoundness of their policies in retail marketing. A striking evidence of this was found in figures prepared and published a few years ago by the Fiore Oil & Gas Company of Madison, Wis., and of which we believe a reprint appeared in the NATIONAL PETROLEUM NEWS, which showed that practically without exception all of the major oil companies were operating their marketing divisions in Wisconsin at a loss and that the only petroleum companies paying income taxes on profits to the State of Wisconsin were independent operators.

"We believe that the petroleum retailers have given a very good account of themselves since the time when, with the advent of the Iowa Plan, they were suddenly left free to handle their business and retail prices on a free and open market basis, just as any other independent merchantile business is handled. Based on our own observations, they have generally conducted the retailing of petroleum products on a much sounder basis financially and otherwise than was the condition preceding the advent of the Iowa Plan. We take our hats off to the petroleum retailers for the courage and ability they have shown since the time when confronted with a man-sized job, namely, the control and establishment of retail pricing for petroleum products, they have very generally made an exceedingly creditable record in the handling of this difficult situation. Most of the current ills are not the fault of, nor do they originate with, the petroleum retailers but have their origin in conditions and policies existing in the production, refining and possibly transportation of petroleum products.

"We fully realize some of the objections and faults which are urged against operations under the Iowa Plan. We know that it is sometimes hard to collect station rents, or find lessees financially responsible. We know that rentals often cannot be obtained on a basis to yield a full return on investment cost, unless the property was built with that end on that basis in the beginning. In other words, you can't get a return on a $15,000 filling station investment if only a $5000 investment was justified. In view of the fact that major oil companies themselves, according to their own books and records, almost without exception failed to make a profitable return under direct operation of their own filling stations, it is perhaps not too bad a record that they are now able to receive some return even if it is not necessarily a net of 6 per cent on the total investment.

"We know that perhaps in some cases the public does not get so much free service as they used to get. The writer used to wonder in former years, before the Iowa Plan, when driving into perhaps a show station of a major oil company and a purchase of only 5 gallons of gas desired, perhaps four attendants would meet the situation, one on each side of the car, one in front and one at the rear. It just didn't seem to make sense as to cost of operations and a return on the investment.

"We do know that most independent owners and operators are very anxious to give their customers the best of service for the very sound reason that upon that hinges their own success and income. In some cases stations now are perhaps not kept as clean as they were in past days although many stations operated by major oil companies then were not necessarily models of cleanliness. We recall that the president of one leading oil company, when traveling about, used to stop in unannounced and test out the restrooms in stations being operated by his own company and quite often wasn't particularly satisfied with the results. In fact, he made some rather forceful comments when once there was no toilet paper in one station restroom when it happened to be an important item to him.

"We feel, however, that defects in present operations will correct themselves under competitive conditions and with free marketing.

"At this time some major companies and perhaps some independent jobbers are nibbling at the idea of taking back their leased stations and operating them direct. While dangling before themselves possible advantages in this reversal of present policies, we wonder if they carefully weigh some of the very serious disadvantages. Will they be glad to pay Social Security and State Unemployment Taxes on all station operators and employees? They might also fall heir to other tax burdens and liabilities from which the independent operator is free. We ourselves see no possibility of successful chain store operation on the employe basis. Local trade is the bulwark and foundation of most successful petroleum retail stations. Local trade can best be secured by the individual owner and operator who operates the station as his own business and one in which he is vitally interested. These facts are too well known to need repetition.

"As long as the Iowa Plan is in effect and has not been suspended or abrogated by major oil companies and others, we believe that interference by any major oil company in the retail price structure is an unfair trade practice and we believe that any such major oil company at once becomes liable for Social Security and State Unemployment taxes, both present and past, on all its lessees and their employes. In other words, you cannot lease out your stations with consequent withdrawal from the retail price market with the advantages inherent to that plan and then at the same time also exercise measures of direction and control on the said lessees in the matter of retail prices, short term leases, etc., that is, you can't do it unless you want to subject yourself to very serious tax liability and a lot of other liabilities, too.

"It is perhaps wishful thinking (and not very wishful at that) on the part of those who advocate a reversal of present retail marketing policies and abrogation of the Iowa Plan, if they think that now the hands of the clock can be turned back and former conditions that existed before the Iowa Plan renewed.

"The petroleum retailer now is not the same man as then. He has had responsibility and independence thrust upon him. He was unorganized then and now is generally well organized and much better posted on conditions and practices in the petroleum industry in general and marketing in particular. New laws, state and federal have been enacted. Business trends and public sentiment have changed as well as buyer policies. We believe that the successful and independent petroleum retailer is the cornerstone on which the oil industry of today must rest.

"Undoubtedly the simplest and best solution of this present question would be for all major oil companies and jobbers as well, to divest themselves of ownership and/or control of retail stations and to depend more upon the quality of their products and efficient operations and less on controlled outlets.

"Regardless of what may be the final outcome as to general adherence to the Iowa Plan, our company expects to follow that plan. We believe in fair margins to petroleum retailers and want to see petroleum retailers successful. We want to see good service given to customers and we want to see petroleum retailing conducted on a sound economic basis and believe it is only possible where the retailer is operating on an independent basis and with free and open retail prices and market."

* * *

By H. W. Dodge, Jr.,
Milwaukee, Wis.

"As a station salesman for one of the few companies now operating its own service stations, I do not have the

long years of observation and experience of some who have entered your debate—"Should the Oil Jobber Take Back his Service Stations?" However, I feel that from the standpoint of the customer and the salesman, or manager—and at the peak of the triangle, the company itself—that most benefit is reaped by dealing with a company-operated service station.

"A customer upon driving into a gasoline station—disregarding quality of products — expects two major things:

"a. A clean, up-to-date station well kept up.

"b. An alert personnel able to take care of his immediate requirements.

"After advertising has brought the buyer into the station, his return visits depend to a great extent on the above factors.

"How are these attained?

"A well-known company as a rule employs a very high type of man. When selecting its representatives, particular attention is paid to getting a man who will be pleasing to the buying public in both personality and appearance. Because of higher wages and steadier work, the company can command a higher type of man. And it follows that the higher type of man will take greater pride in his organization, and, with the incentive of promotion lacking in a dealer outlet, strives harder to hang up a good record.

"A company does not stop at merely employing a man. It invests in that man a large sum of actual cash to train him in the business—and as long as he is in its employ continues to give him all available knowledge of the products he is to sell and services he is to render—and the most modern and efficient devices with which to dispense the products or services—and last, but not least, endeavors to 'sell' the salesman on its products. In addition to that there is constant supervision of his methods and quality of work—it is a known fact that many men work better under a tangible boss than on their own.

"Because of constant supervision, the customer knows he will get exactly that for which he pays, and, if anything should go wrong due to servicing of products, the company will reimburse him for damages sustained. Also, he is assured of clean restroom facilities which, under the dealer plan, are not always as satisfactory as national advertising would have us believe.

"Then, too, we have the station manager's slant to consider. Under its tutelage, he has not only its advertising but its financial resources to help him run the station. He is furnished necessary assistants, all necessary items for upkeep and current operations. Many dealers today are operating on a shoestring at best and can ill afford the service possible by a large company—and when a recession occurs, or a price war looms on the horizon, he either has to cut his losses then, or take a chance on going further into debt with the possibility at the end of losing his shirt. The company employe has, too, the unquestionable advantage of a steady income, which results not only in peace of mind as far as personal affairs are concerned, but affords him greater security than the dealer who may have to use up all of his next season's profits to pay off the previous season's losses due to a closed highway or street, change of buying habits, or any one of a dozen reasons contributing to decreased gallonage. The company employe is furnished with new worthwhile devices which the dealer may not be able to afford—which is no small item in itself contributing to better workmanship and building up of customer confidence.

"And last, but not least, are the restrictions a company lays upon its employes — well thought out — which tend to eliminate discrimination between customers — a discrimination which, whether it be prices or favors, can lead to unfair trade practices and to eventual losses on the dealer's part.

"In conclusion, it appears to me that the customer on the whole will be better satisfied, and more uniformly, with a company operated station because of a more alert, better trained personnel and assistance it can and does give its own outlets than with a dealer who may or may not follow the lessor's

TELEVISION

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The RCA MANUFACTURING CO. apply "dag" colloidal graphite to the interior walls of television's picture-taking and projecting tubes - thereby intensifying, shielding, and focusing the sensitive, image-forming beams. "Getter" action is also provided.

The part "dag" has played in the development of television is indicative of its versatility, permitting it to serve, for example, as a lubricant for steam cylinders, compressors, and internal combustion engines; as an impregnant of materials, to effect lubricity, opacity, or electrical conductivity as desired.

A request on your letterhead will bring a new 40 page booklet which outlines the 19 properties and 181 applications of "dag" Brand colloidal graphite in industry.

ACHESON COLLOIDS CORPORATION
PORT HURON MICHIGAN

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COLLOIDAL PRODUCTS

suggestions and routine. And what is a better formula for success than satisfied buyers and satisfactory employes?"

* * *

When companies get as large as the major oil companies are, it makes it most difficult for the general executive to get a policy in effect just the way they want it—and on the other hand, it is hard for a "kick" or a fact from a competitor to get all the way up in the way the competitor wants it. So, on the theory we are serving both competitors and majors, we pass on for the former, the "kick" contained in the following letter from an old subscriber out on conservative Cape Cod. If any major will write us his troubles we will guarantee to pass them on not only to Mr. Gould of the Cape Cod Oil Company but to all their other competitors. —EDITOR.

Dear Editor:

"I have been meaning to write you for some time—ever since reading your splendid editorial in the February 8th issue called 'Profitable Prices are made by Men of Courage.'

"Somehow this article interested me to the point where I felt I could give you an answer and some plain facts which might do some good. Trouble is the truth hurts and this is one reason so little has been said. However, when you say Men of Courage I assure you it does not belong to the Major Oil Companies. In fact if they had a little courage combined with the dictates of common sense this marketing business would not be in the chaotic condition we find ourselves today.

"In the mean while you have gotten ahead of me and by your articles in the February 15th issue 'Should the jobber take back his service station' and the March 1st issue 'Jobbers and Dealers Join Debate on Companies Taking Back Stations' many of the points I wanted to mention have been most ably taken care of. Far better than I could do and in a lot more peaceful language.

"To start with why forget the Major oil companies and leave them out of the picture—they are deeply involved and far deeper than any jobber could ever afford to be. The blame belongs on the leaders and the big concerns—not on the poor jobber.

"I only wish that it were possible to see that every executive of the big oil companies read every word in your articles mentioned above and furthermore studied, memorized and took same to bed with them.

"In my way of thinking the manner in which the marketing end of this petroleum business has been conducted in the majority of cases is nothing short of a perfect disgrace to the brains of the industry. The deception, the waste of money, and the complete lack of common sense as shown by the big companies is far beyond me. What can the oil companies be thinking of is what I want to know. If only the chief executives could get on the end of a gasoline hose in a busy station for a day and talk with the consumer then go on and talk with the dealer trade this frightful condition would not exist.

"This business will never be right till such time as the jobbers and major oil companies take back their own stations and investments and in turn face the real overhead similar to any other business. Instead they have been afraid to face the music, overhead and annoyance etc. and have openly acknowledged they are mentally unable to conduct their own outlets. All this grief has been turned over to the poor dealer, licensed operator or whatever you care to call him. The big companies get his signature on a piece of paper that prevents the color of the gasoline pumps being changed for five years and this is all they care about. Let the dealer starve to death, sell apples, bags of coal, candy, chewing gum, razor blades etc.,—in fact sell anything he wants in order to pay the oil company rental, light, heat and water bills and the like. The only way the operator knows to increase sales is to cut the price on gasoline—the line of least resistance and of course he knows nothing else—you can't blame him. All the big companies are interested in is the wholesale profit.

"As one of the selectmen of this town said to me the other day, when a man is out of work, young or old, the first thing he thinks of is to run a gasoline station or a liquor store. As a result there are more misfits in the marketing end of this industry than probably any other. But the oil companies are to blame, they have encouraged it and gone out and deliberately subsidized the dealer—given him anything he asked for—installed pumps, tanks, lifts, signs, air towers wiring, etc., which in many instances is worth far more than the man's property and building. Could anything be more insane? Is there any other business where the big companies put their customers in business and carry the investment for them? I don't know of any.

"For example in this town a major company recently invested at least $7500 in a station and this past year they rented it to a person to run on a one cent rental basis. I am told the total rent for the year did not amount to $25. You can imagine the high type of operator they secured. This investment is now offered for sale at a frightful loss. This is a handsome return to offer the stockholder who has invested in the oil company. Of course, this is just one of many similar cases in this immediate area—and certainly Cape Cod is no exception to the rule of the entire country. The same thing goes on everywhere.

"Another beautiful example of the brain trusters of this industry is their commercial consumer policy. The dealer's customer can buy as cheap as the dealer who has signed his life away to the big company. This is the type of co-operation given the marketing end of the industry. In this community we recently lost one of these back yard accounts to one of the major companies who thought because this party used all of 5000 gallons a year they should be entitled to a gasoline price several cents below what the one hundred per cent dealer pays that same company. This is how bad the big companies want gallons—regardless of the common sense or profits.

"There is another absurd policy of the industry I want to mention. Namely, selling the commercial account not at the tank wagon but at the tank car price and in turn giving the commercial account a spread on gasoline for their own use equal or better than the distributor can enjoy. What is worse the oil company makes the installation for the commercial account making still more overhead. We have an example where a party with a 500-gallon tank can buy from a major company at one-half cent below the commercial tank car in 100 gallon lots. Can you imagine anything more insane or anything to ruin the morale of the dealer trade any faster than by such action.

"If the day will ever come when the oil companies can get through their heads the idea of sending their men in the field to sell their merchandise on its merits, colors, distribution, acceptance, etc., instead of this all they do is sell gallons and the mere item of profits and common sense are not allowed to enter the picture.

"This all comes down to the poor stockholder who pays the bills in that he gets no return on his money for the 'jackass' management of the oil trusts. I should say in passing that the company I represent is a great exception to the rule in that they do consider the stockholder first, but this does not apply to many of the companies—I am sure of that.

"Where would the big oil companies be if they had to live on the profits they make from marketing? They could not exist. Still they expect the distributor, jobber or dealer to live on the marketing profits alone. If the oil companies had to make a profit from marketing this industry would not have gotten into the mess it is in today. It is too bad they have the refining, production, transportation, etc., to make a profit on and in turn carry the loss of the marketing.

"Turning from the gasoline end of the business, have you ever thought of the beautiful mess they have made of the heating oil market? Ten years ago the major companies had all the business in their lap but they did not have sense enough to keep it. They wanted more gallons instead of more profit so they put every individual who owned a truck in business to go out and cut the throat of the supplier. This is the result of lack of courage or brains pure and simple. As a result today the major oil companies enjoy a very limited percentage of the heating oil trade. They have in turn no one to thank but themselves. This again is nothing short of the fact they do not know the meaning of the word marketing or merchandising. They could not sell to the consumer but the peddler could—the ice man, coal man, lumber man, wood man, hardware store, etc. etc.

All these could do the job and have done it well. The oil companies couldn't face it and threw up their hands. Today they sell to anybody with a truck at approximately the same figure as the jobber or distributor with a real investment of trucks, tanks, pumps, storage plant, railroad siding etc. set up to properly handle the marketing end of the business. Is it any wonder that some of us get disgusted and lose patience with the industry where we have our money invested—all due to the scatterbrained management of the big oil trusts."

(Signed) **Edward W. Gould, Jr.,** Pres.,
Cape Cod Oil Co.,
Hyannis, Mass.

Mr. Warren C. Platt, Pres.,
National Petroleum News
1213 West 3rd St.,
Cleveland, Ohio.

Dear Warren:

I want to congratulate you on the thirtieth birthday of your NATIONAL PETROLEUM NEWS.

I am one of the few and probably the last one in New England left who remembers the beginning of your magazine. As your editorial on this subject conveys, there have been extraordinary changes in the oil business in this period which not even the most astute mind could have dreamed of.

One outstanding problem that we have always thought was with us since the very beginning was the Independent's early demise, and even today it is preached. Half the time I don't know what the word "independent" means—when one starts being "independent", or when one stops being "independent". Consequently, as I grow older I think you will join me in looking at the picture with optimistic eyes, wherein all will share in the abundance of a well run industry.

With best wishes for a happy anniversary and many years of health and prosperity for both you and your paper, believe me

Sincerely yours,
Fred E. Bergfors, Treasurer
Quincy Oil Co.,
Quincy, Mass.

CHICAGO—Protest of Marquette Petroleum Products, Chicago, that use of the word "mobile" on Illinois' new traveling oil inspection laboratory was "advertising one of the major oil companies" was rejected as "far-fetched" by Supervisor C. S. Holmberg of the state motor fuel tax and oil inspection divisions.

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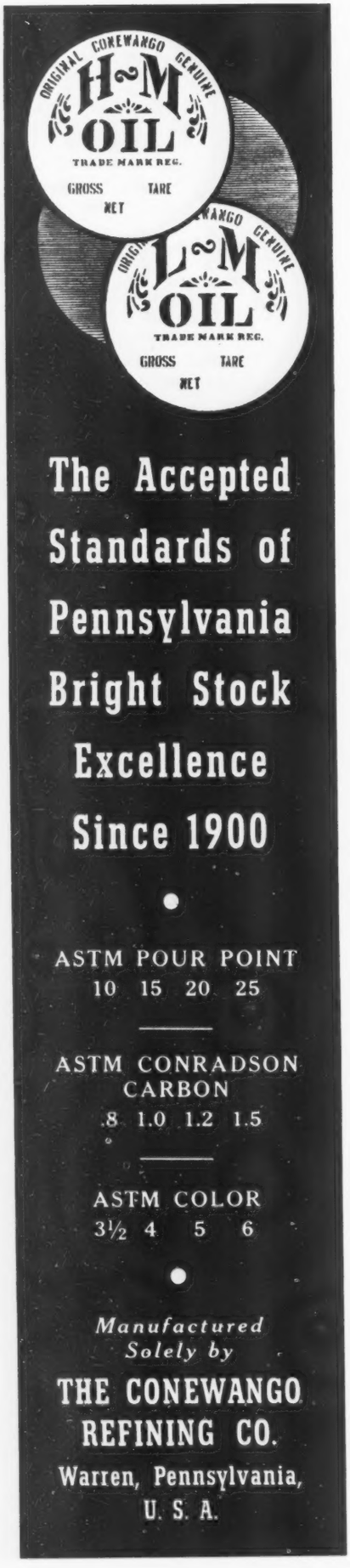


Fair Trade Laws are Here to Stay, Los Angeles Dealer Convention Hears

N. P. N. News Bureau

LOS ANGELES, March 18. — "Fair trade laws are here to stay, whether some merchants like it or not, and it is up to industry to adjust its operations to this fact". This was the essence of remarks by J. Wesley Cupp, attorney, in addressing delegates to the 5th birthday convention of the Retail Petroleum Dealers Ass'n. in Los Angeles March 14.

In the largest meeting of its kind on the Pacific Coast, dealers heard Cupp say that fair trade practice statutes were supported by the ethical businessman but that these laws were no substitute for salesmanship, efficiency, or sound methods of operation. He said there was nothing economic in a man selling a product below what it cost, including cost of doing business, but that it was both economic and democratic for an industry to police itself.

Outlining the history of various trade practice regulations now appearing on federal and state statute books, the speaker said numerous new laws and amendments to existing laws were waiting action by lawmakers in session at Sacramento, including provisions for a commission to enforce the unfair practices act and modify this measure in other respects.

Geo. M. Irving, sales counselor, in a talk on merchandising said service station operators must do a far better selling job today than was necessary a few years ago; that the dealer had to serve many more customers to get the same amount of business.

He urged dealers to live their sales story, to dramatize it by use of proper words, tones and actions and likened a salesman to the artist who holds the attention of an audience by painting a picture. However, he said the salesman's job was more difficult because he did not have the picture constantly before him.

'Business is Fine'

Irving said there was too much "wrong thinking" among salesmen in general. That there was too much looking back on the "good old days" when competition was less keen, profits higher and so on.

He said too many merchants are basing their sales efforts on the average saying: "Conditions must be tough. No one is doing anything. I guess I am not so bad". Conditions are changed today, that it was necessary to go out after business, he added. Above all, he urged dealers to greet their customers with a smile and answer the query of "How's Business" with "Fine and Dandy".

"Selling more Petroleum Products at a Profit" was the subject of an illustrated talk by R. A. Crosby, Los Angeles department of water and power. He showed instances in which improved service station lighting had increased night and day sales volume. Clean lamps and reflectors were important, he said, because a month's accumulation of dust will cut the lighting efficiency 20 to 25 per cent.

W. B. Wylie, executive secretary of R.P.D.A. reviewed efforts by the organization of the past five years to stabilize the California retail petroleum markets and obtain reasonable margins of profit for the dealer, by working against under canopy price cutting, below cost selling, or other practices resulting in unfair competition.

Attended by nearly 500 dealers and marketing company representatives, a dinner and floor show featured the night session of the convention.

Talco Plant Is Operating

MT. PLEASANT, Tex.—Talco Asphalt & Refining Co. is operating at full capacity, and has been since January 1, J. K. MacKinnon, general manager, announces, denying rumors that the plant was shut down. During December, the plant was closed for three weeks for general inspection, he added.

PHILADELPHIA—Atlantic Refining Co. will broadcast more than 1807 baseball games this season over a web of 39 radio stations extending from New Hampshire to Georgia.

Canfield Drivers Win Safety Awards

CLEVELAND — Twenty-six awards by the Cleveland Safety Council were recently made to truck drivers of Canfield Oil Co. with records of from 18 months to six years without a chargeable accident. At the same time 33 insurance company awards went to Canfield drivers for one to two years without a chargeable accident.

Tank Truck Safety

Caution signs are attached to hose nozzles on the unloading lines of tank trucks of the Humble Oil Refining Co. at the suggestion of A. L. Jepson, of the company's Beaumont bulk station. The suggestion won a $10-award in the company's "Coin-Your-Ideas" plan.

Uses Old Air Hose

A use for discarded air hose has been found by C. W. Hindman, of the Houston bulk station of Humble Oil and Refining Co., as conduit for light wire on trucks. His company thought enough of the idea to make an award of $5 and pass the idea around to other plants.

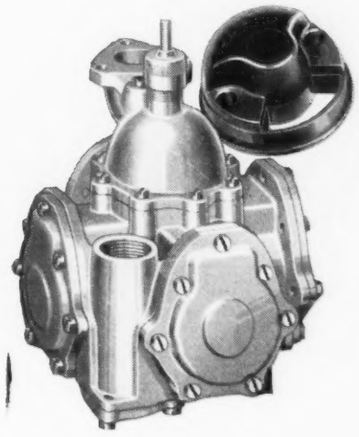
New Equipment

AND THE MANUFACTURERS

NEW MOTOR LINE—Additions to their line of explosion-proof motors (both polyphase and single phase) have been announced by Howell Electric Motors Co., Howell, Mich. These additions bring the line up to 40 horsepower. Their range previously covered ¾ to 10 horsepower motors. All motors are approved by Underwriters' laboratories, the company states.

* * *

CARBON VALVE—A new carbon valve for dispensing pump meters has been announced by Wayne Pump Co. It is made of molded graphite and is



said to practically eliminate the "overload" on leather plungers caused by undue friction. The new carbon valve is self-lubricating, it is reported, and therefore develops practically no friction in the valve.

* * *

ADJUSTABLE LAMP SOCKET—A new adjustable lamp socket, which is claimed to overcome difficulties in adapting new sizes of lamps to existing equipment is being offered by Goodrich Electric Co., Chicago. The socket is provided with two slotted prongs. These with a slotted ring which holds a resilient spring-suspended socket complete the assembly. By compressing the prongs, the socket can be adjusted to four positions, the company states.

* * *

NEW STATION HOSE—The Goodyear Co. has announced a new service station gasoline pump hose. It is made with an all "Thiokol" inner tube, three braids of heavy cotton yarn, with a braided bonding wire in the second braid. The cover is high tensile, abrasion and sun-resisting, it is stated. The new hose is known as Style BF gasoline.

* * *

PERSONNEL—The following changes in personnel have been announced by the Alemite Division of Stewart-Warner Corp., Chicago: J. C. Harger, transferred as manager of southwest district to manager of southeast sales district, succeeding A. F. Haberl, who was made manager of the east-central district; Roy A. Sands appointed manager of the southwest district.

* * *

NEW LOCATION—J. H. Crosier, Rochester, N. Y., distributor of bulk and service station equipment, reports moving his headquarters from 300 East Ave. to 33 University Ave. in that city.

* * *

NEW DISTRIBUTOR—The Warner Lewis Co., Tulsa, announce their appointment as distributors for Wayne Pump Co. They already represent Viking Pump Co., Brodie Meter Co., Morrison Bros. Co., and others.

CASH

TO COMPOUNDERS . . NOW YOU CAN MAKE YOUR OWN MILD E. P. LUBRICANTS WITH PENOLA MILD E.P. BASE

TODAY *any* compounder of lubricating oils can meet widespread current requirements for a mild extreme pressure lubricant!

Out of a long and successful experience in the extreme pressure field, Penola has evolved Penola Mild E. P. Base. With this tried and proven product, blending procedure is simple, using only one part of the base to about nine parts of the oil by volume.

Penola Mild E. P. Base may be readily blended with any stock—Pennsylvania—Mid-Continent—Coastal—and it is fully soluble in all of them. Either in storage or after blending, it is chemically stable and will not separate out.

Penola Mild E. P. Base contains no active chemical other than non-corrosive sulphur. The Base itself is non-corrosive *even in the presence of moisture.* It is free from wear-producing sediment or partially soluble materials which might precipitate. And the extreme pressure properties which it induces are *permanent.*

Beside being easy to handle, store and blend, Penola Mild E. P. Base widens the range of applications open to a mild extreme pressure lubricant, to include all gears on automotive vehicles except the most severe hypoid applications.

The market for mild extreme pressure lubricants is a great and growing one. Get your share of the profits which it offers . . . and the customers waiting to be sold.

WRITE FOR FREE BOOKLET . . . Let us send you the complete and up-to-date account of what Penola E. P. Base is and how easy it is to use . . . 14 pages of facts that will help you to cash in on the demand for mild extreme pressure lubrication with a product of your own blending, sold under your own name.

PENOLA MILD E.P. BASE

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WORLD'S LEADING MAKERS OF SPECIALIZED LUBRICANTS

"STRICTLY PERSONAL"

Harold B. Fell, executive vice president of the Independent Petroleum Assn. of America told members of the Panhandle Producers & Royalty Owners' Assn. recently that the problem of the producer now is a drilling curb, with weakness of the present proration system, principally due to the failure to consider the size of the tract served by a well as a prime factor in setting allowables.

* * *

A. F. Hickey has been appointed general manager of Imperial Refining Co., Grand Rapids, Mich. He has recently been associated with Midwest Refining Co., Alma, Mich., as sales representative, and for several years prior to that he was vice-president in charge of sales for Naph-Sol Refining Co., Muskegon, Mich.

* * *

C. T. Dougherty, St. Louis sales division of Standard of Indiana, has been promoted to manager of the company's lubricating bulk sales department in Chicago to succeed **L. G. Campbell** who resigned.

* * *

Carl Bierman, director of the Utah Ass'n. of Petroleum Retailers, Salt Lake City, recently motored here to attend the fifth birthday convention of the Los Angeles Retail Petroleum Dealers Ass'n., March 14. He will study California marketing conditions while he is here.

* * *

H. H. Black, formerly in Shell Oil Co.'s Fresno office and more recently in the San Francisco headquarters, has been made assistant manager of the company's new sales and marketing depot in Los Angeles.

* * *

Among Californians enroute to Washington to oppose government appropriation of oil bearing tidelands at hearings scheduled for March 20, are **Ralph E. Forch,** Wilshire Oil Co. and president of United Landowners Ass'n. —an organization formed to coordinate California opposition to this seizure a year ago—**Kirk E. Boone,** of Bankline Oil Co., and various Los Angeles and Long Beach city officials.

* * *

George W. Holland, chairman of the Petroleum Conservation Division of the U. S. Interior Department, attended a meeting of the California central proration committee in Los Angeles, March 17, before leaving for Sacramento where he will attend a scheduled hearing March 21 on the proposed state oil control bill. Holland was suffering from a broken arm caused by a slip on an icy Washington street.

* * *

Paddy O'Connor has organized the O'Connor Petroleum Co., with offices at 60 East 42nd Street, New York City. He will operate as a general oil broker. He was formerly associated with the Bennett Oil Co. of New York.

* * *

Mr. and Mrs. Hal Wagner, newlyweds, are at home at 537 Deming Place, Chicago. Wagner is advertising manager of Deep Rock Oil Corp. Mrs. Wagner was Miss Olive Phillips.

* * *

C. L. Henderson, Vickers Petroleum Co., recently suffered the loss of his mother, who passed away in Knoxville, Tenn.

* * *

A. R. Glendening, formerly with Alemite Corp., is now distributor in Wisconsin for oil and lubricants made by Waverly Petroleum Products Co., Philadelphia, Glendening's headquarters are at Milwaukee.

* * *

H. W. Johnson, of Hi-Test Oil Co., Freeport, Ill., won the door prize and **R. A. Pentz,** of the traffic department of the Alton railroad, won the raffle prize at the Chicago Oil Men's Club bridge party here recently.

* * *

New officers of the Michigan Dixie Board of Dixie Distributors, Inc., elected recently, include **Royal E. Decker,** Plymouth Oil Co., Detroit, president; **J. W. Gehrken,** Monroe Cooperative Oil Co., Monroe, vice-president. **Paul R. Kempf,** Staebler Oil Co., Ann Arbor, was re-electetd secretary-treasurer and purchasing agent.

* * *

V. R. Currie of Houston, The Texas Co., is general chairman of a Gulf Coast chapter of the American Society of Safety Engineers recently organized in Houston. **J. J. Delahide** of the B. F. McDonald Co. is vice chairman and **R. G. Naul** is secretary-treasurer.

* * *

At a recent meeting of the Oklahoma Dixie board of directors, **Floy E. Morrison,** president of the Allen Oil Co., Hinton, Okla., was elected president. Other officers elected were **Grady O'Bannon,** O'Bannon Oil Co., Okmulgee, vice-president; and **H. B. Gannaway,** Dixie Super Service Co., Clinton, Okla., secretary-treasurer. Other members of the Oklahoma Dixie board, in addition to the officers, are **C. B. Dobey,** Home Oil Co., Prague, and **Ben Musick,** Musick Oil Co., Kingfisher.

* * *

David A. Locke has resigned his position with Quaker State Oil Refining Corp. and has purchased the service station at Rancho Santa Fe, Calif. He is a son of **George D. Locke,** retired vice-president of Barnsdall Oil Co., who is a resident of Rancho Santa Fe.

NOTICE

All interested in the natural gasoline tank car prices

The following letter has been sent to the natural gasoline manufacturers in the southwest who seem to be all those active in "open spot" transactions. We will appreciate comment from anyone, either buyer or seller, who may be interested.

The W. C. Platt Company

"We of the *Oilgram* have again been investigating and studying methods of gathering and publishing natural gasoline prices for some months. We have talked to or written all whom we know as important factors in the manufacture and sale of natural gasoline in the Mid-Continent area. Our conclusions as to the best way of gathering and publishing this price information are:

"1—Prices of open spot sales only will be shown as such.

"2—Days when no open spot sales are reported, prices of firm quotations open to all buyers on which seller will make delivery will be shown and so indicated.

"3—The *Oilgram* and its representatives receive the foregoing information from you and every other natural gasoline manufacturer on your representation that such price information conforms in every respect to the foregoing conditions and that the goods covered by such prices comply with the trade's usual specifications therefor. In publishing these prices, you and the other manufacturers understand that the *Oilgram* does so solely on your representations, and that the *Oilgram* is under no obligation to question the representations and does not guarantee or warrant their character in any way.

"4—The business day closes at 2 o'clock p. m.

"The *Oilgram* is now contacting the following sellers in the Mid-Continent area for natural gasoline prices:

Akin Gasoline Co., Tulsa, Okla.
Hanlon-Buchanan, Inc., Tulsa, Okla.
Hurley Gasoline Co., Tulsa, Okla.
Tide Water Associated Oil Co., Tulsa, Okla.
Warren Petroleum Co., Tulsa, Okla.
Skelly Oil Co., Tulsa, Okla.
Sinclair Prairie Oil Co., Tulsa, Okla.
Phillips Petroleum Co., Bartlesville, Okla.
Cities Service Oil Co., Bartlesville, Okla.
Lone Star Gasoline Co., Dallas, Texas.
Shamrock Oil & Gas Co., Amarillo, Texas.
Otha H. Grimes, Tulsa, Okla.

"The *Oilgram* will supply this list to whomever is interested, or the list as it may be changed from time to time, on request.

"We believe this to be the most accurate and fairest way of showing price information in regard to this product. It varies from our present method only to the extent that today we show both quotations and sales, whereas under this method the days when sales are made and reported to us, we will show only prices from such sales.

"Unless we hear good reason to the contrary from all those interested—both buyers and sellers—we will put this method into effect April 1st."

Markets

Mid-Continent

TULSA, March 20.—A 350-car sale of 59 octane gasoline—the largest sale reported to *Oilgram* in months, was reported last week by an East Texas refiner at 4.375 cents for "balance-of-March" delivery. Although the refiner would not reveal to whom the sale was made, he indicated it was not to a jobber. Two East Texas refiners reported advancing their quotations for 400 e.p. gasoline 0.125 and 0.375 cents, to 4.125 and 4.375 cents.

Two North Texas refiners reported advancing their gasoline quotations 0.125 to 0.5 cent last week. An Arkansas refiner said "local competition" made necessary a reduction of 0.625 cent in his quotation for 67-69 octane gasoline, to 4.5 cents f.o.b. plant for Louisiana-Arkansas delivery.

An Oklahoma refiner, who said he was in market for 50 to 75 cars of 67-69 octane gasoline for immediate delivery, reported his lowest buying price was 4.25 cents f.o.b. Group 3 for Missouri and Iowa destinations. He said supplies were closely held, as did some other refiners and brokers.

California

LOS ANGELES, March 18.—Suppliers interested in west coast offshore markets reported a dearth of active inquiry and no spot sales of any size. Japanese buyers were understood to be feeling out the position of California companies able to supply bulk quantities of crude oil carrying a guaranteed 15 per cent 92 octane gasoline, with the addition of 0.1 of one per cent lead.

Sounding out of Atlantic Foreign buyers interested in cargo lots of gasoline, developed the information that the product must carry not less than a 65 octane rating and an f.o.b. California price of not to exceed 4 cents a gallon. As far as could be learned, local suppliers were not interested.

Domesticwise, the situation was featured by slightly lower quotations on unbranded motor fuels reported by independent plants in the Los Angeles Basin. Compared to previous level of 6.75 cents, at the rack exclusive of tax, sales were reported by two plants at around 6.5 cents.

Eastern

NEW YORK, March 20.—Some sellers in the Boston and Philadelphia markets reported reducing their prices for high octane gasolines the week ended March 18.

Some reports of lower prices for shipment out of Baltimore, which were in competition with gasoline from Philadelphia also were heard, but sellers said they were holding to 6 cents minimum.

Reports of high octane grades being offered at lower prices for barge movement from New York harbor, were heard during the week. Generally, however, prices ranged upward from 5.625 cents, sellers said.

Demand for gasoline continued to hold up well, according to reports of distributors. Several said that sales in the first two months this year were up as much as 10 per cent from January and February of last year.

Gulf

NEW YORK, March 20.—In the face of relatively light trading, gas oil prices were reported lower at the Gulf by some refiners the past week.

One refiner reported he was offering low diesel index gas oil for foreign shipment, and No. 2 fuel oil, at 3.125 cents per gallon, in cargo lots, f.o.b. Gulf. Another large supplier said he had quoted 3.25 cents on a cargo of high diesel index oil for foreign movement. Another refiner reported that he had sold two small part cargoes of gas oil at 3.3125 cents, f.o.b. Gulf.

Gasoline was featureless and reports from traders conflicted. Several said gasoline was freely offered while others reported refiners were inclined to hold material rather than offer at current prices.

Pennsylvania

CLEVELAND, March 20.—Twenty-five pour test Pennsylvania neutral oils were priced higher in the week ended March 18, according to reports from the field. Wax also was quoted higher, reports indicated.

The 25 pour test 200 neutral was held at a minimum of 15.5 cents, up 0.25 cent, with quotations ranging up to 16.25 cents, refiners said. Quotations reported for 25 pour test 150 neutral ranged from 13.50 to 14.25 cents, up 0.25 cent on the low side.

Export demand for wax was reported unusually heavy. Four refiners said they were sold up for 30 to 60 days. Both the 122-124 and 124-126 A.M.P. white crude scale grades were held at 2.6 cents, New York, up 0.05 cent, according to reports.

Mid-Western

CHICAGO, March 20.—Open spot sales of 12 cars of gasoline were reported by refiners and tank car marketers here last week. One refiner reported advancing his gasoline quotations 0.125 cent to 4.125 cents for 62 octane and below, 4.375 cents for 67-69 octane and 4.875 cents for 70-72 octane gasoline. No other changes in gasoline quotations were reported. Supplies of all grades of gasoline continued to be closely held by refiners, according to reports of resale agents.

Jobber inquiry for kerosine in anticipation of spring farm demand was active, reports indicated. One refiner said he was temporarily out of kerosine. Quotations reported ranged from 3.5 to 4.375 cents.

Wax

NEW YORK, March 20.—White crude scale wax prices continued to climb, both at the Gulf and New York, in the week ended March 18. Sales and offerings of white crude scale wax were reported at 2.60 cents. Some sellers said they were holding this grade at 2.75 cents. Fully refined wax prices were reported unchanged.

N.P.N. Gasoline Index

	Dealer T.w. Cents per Gal.	Tank Car Cents per Gal.
Mar. 20	9.40	5.44
Month ago	9.35	5.40
Year ago	10.09	5.92

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 12 wholesale markets for regular-grade gasoline.

Fuel Oil

CHICAGO, March 20.—Open spot sales of 8 cars of light fuel were reported by Chicago resale agents during the past week. Colder weather at the end of the week resulted in an appreciable increase in the number of orders for "rush shipment" from jobbers, they said. No changes in light fuel quotations were reported during the week.

Two marketers reported increased demand for No. 6 fuel. Most of this material was for use in the Chicago area although a fair amount was being shipped to industrial sections of Ohio, they said. No changes were reported in heavy fuel quotations.

ALMA, March 20.—Jobber demand for all grades of light fuel continued active, according to Michigan refiners last week. Supplies in most instances were low, they said. Quotations reported for No. 1 p.w. distillate ranged from 4.5 to 4.75 cents.

Two refiners said they were out of the heavy fuel market temporarily. No changes were reported in heavy fuel quotations. Supplies were closely held, refiners said.

TULSA, March 20. — A supplier of Oklahoma 28-30 zero fuel reported reducing his quotation 0.125 cent last week to 2.75 cents; other quotations reported for this product ranged from 3 to 3.25 cents. No other changes in light fuel oil prices were reported in the Mid-Continent.

Demand for light fuels from northern heating oil distributors was reported

(*Continued on page* 44)

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel of 42 gallons, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline

Prices Effective	March 20	March 13
OKLAHOMA		
U. S. Motor: (Octane L-3)		
62 oct. & below	3.75 – 4.25	3.75 – 4.25
63-66 oct.	4.00 – 4.25	4.00 – 4.25
67-69 oct.	4.25 – 4.625	4.25 – 4.625
70-72 oct.	4.50 – 5.00	4.50 – 5.00
60-62, 400 e.p.	(h)3.75	(h)3.75
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
U. S. Motor:		
Min. 65 oct.	6.00 – 6.75	6.00 – 6.75
Min. 70 oct.	(h)6.50	(h)6.50
"Q" gasoline	(g&h)6.50–6.75	(g&h)6.50–6.75
Other districts:		
Motor gasoline:		
U. S. Motor (58-62° gravity):	4.25 – 5.00	4.25 – 5.00
"Q" gasoline	(g) 6.25– 7.00	(g) 6.25– 7.00
CENTRAL MICHIGAN (a)		
Str.-Run Gasoline	(c) 4.00– 4.50	(c) 4.00– 4.50
U. S. Motor: (Octane L-3)		
67-69 octane	(e)6.50	(e)6.50
70-72 octane	7.25 – 7.75	7.25 – 7.75

Prices Effective	March 20	March 13
CALIFORNIA (3c tax to be added if used in state)		
U. S. Motor:		
54-58 gravity, for in-state shipment	6.50 – 9.25	6.75 – 9.25
54-58 gravity, for out-side state shipment.	6.25 – 9.00	6.25 – 9.00
58-61 gravity, 375-400 e.p., 65 oct. & above	7.75 – 9.75	7.75 – 9.75
N. TEX. (b)		
U. S. Motor: (Octan L-3)		
62 oct. & below	3.625– 4.25	3.625– 4.25
63-66 oct.	4.25 – 4.50	4.125– 4.50
67-69 oct.	4.375– 4.75	4.25 – 4.75
70-72 oct.	4.50 – 5.125	4.375– 5.125
60-62, 400 e.p.	(h) 3.75– 3.875	(h)3.625
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane L-3)		
62 oct. & below	3.875– 5.00	3.875– 5.00
67-69 octane	(h) 4.375–5.50	(h) 4.25– 5.50
70-72 octane	4.75 – 5.875	4.75 – 5.875
W. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	(h) 3.875–4.50	(h) 3.875–4.50
63-66 oct.	(e)4.25	(e)4.25
67-69 oct.	(h) 4.50–4.625	(h) 4.50 –5.125
70-72 oct.	(h) 4.75 –5.00	(h) 4.75 –5.00

Prices Effective	March 20	March 13
CENTRAL WEST TEXAS (Prices to truck transports)		
U. S. Motor Gasoline: (Octane L-3)		
62 oct. & below	(e) 3.75 – 4.00	(h) 3.625– 4.00
63-66 octane	(e)4.75	(e)4.75
66-70 octane	(e)5.25	(e)5.25
E. TEX.		
U. S. Motor Gasoline, (Octane L-3)		
67-69 oct.		(e)4.25
70-72 oct.	(h) 4.50 –4.75	(e)4.50
60-62, 400 e.p.	(b) 4.125–4.375	4.00
N. LA. (For shipment to La. & Ark.)		
U. S. Motor: (Octane L-3)		
62 oct. & below	(h) 4.125–4.375	(h) 4.125–4.375
63-66 oct.	(e) 4.375–4.623	(e) 4.375–4.625
67-69 oct.	(e) 4.625–4.875	(e) 4.625–4.875
70-72 oct.	(e) 4.875–5.375	(e) 4.875–5.375
ARKANSAS (F.o.b. Ark. plant of one refiner, for shipment to Ark. & La.)		
U. S. Motor: (Octane L-3)		
62 octane & below	4.00	4.00
67-69 oct.	4.50	5.125
OHIO (S. O. Ohio quotations for statewide delivery and subject to exceptions for local price disturbances)		
U. S. Motor	7.25	7.25
Above 65 oct.	7.50	7.50

(Continued on next page)

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations; Group 3 prices quoted for northern shipment. (c) Excluding Detroit shipment. (e) One refiner quoting. (f) Two suppliers quoting. (g) To resellers holding licenses. (h) Two refiners quoting.

MID-WESTERN TANK CAR MARKET

Prices in this Midwestern Tank Car Market table are gathered from refiners and tank car marketers or brokers from their offices located in Chicago and the surrounding territory. While the prices are quoted on a Group 3 (Oklahoma) freight rate basis, this is in accordance with the custom of the oil industry which uses Group 3 as a price basis for the ease of comparing prices even when the material originates in another refining district. Generally when prices are quoted in this Chicago market, the origin of the material is not known at the time the quotation is given, oftentimes even with the quoting refiners who have refineries in more than one refining district. All other gasoline prices are given by and for the particular refining district where the material is made and from which it is shipped.

Gasoline

Prices Effective	March 20	March 13
U. S. Motor: (Octane L-3)		
62 oct. and below	3.375– 4.125	3.375– 4.00
63-66 oct.	3.75 – 4.00	3.75 – 4.00
67-69 oct.	3.875– 4.375	3.875– 4.25
70-72 oct.	4.125– 4.875	4.125– 4.75

Kerosine

41-43 gravity, w.w.	3.50 – 4.125	3.50 – 4.125
42-44 gravity, w.w.	3.625– 4.375	3.625– 4.375

Fuel and Gas Oils

Prices Effective	March 20	March 13
No. 1 p.w.	3.375– 3.875	3.375– 3.875
No. 1 straw	3.375– 3.625	3.375– 3.625
No. 2 straw	3.25 – 3.50	3.25 – 3.50
No. 3	3.00 – 3.25	3.00 – 3.375
No. 5	$0.575–$0.70	$0.575–$0.65

Prices Effective	March 20	March 13
No. 6	$0.35 –$0.45	$0.35 –$0.45
U. G. I. gas oil	2.625– 3.00	2.50 – 2.875
Range oil	3.375– 4.00	3.375– 4.00

Naphtha and Solvent

Stoddard solvent	5.875	5.875
Cleaners' naphtha	6.375	6.375
V. M. & P. naphtha	6.375	6.375
Mineral spirits	5.375	5.375
Rubber solvent	6.375	6.375
Lacquer diluent	7.375	7.375

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended March 17, 1939)

U. S. Motor, (Octane Number determined according to L-3Method in Okla., Texas and Mid-Western Districts):	March 13	March 14	March 15	March 16	March 17
62 octane and below:					
Oklahoma	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25
(a) North Texas	3.625– 4.25	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25
West Texas	(d) 3.875–4.50	(d) 3.875– 4.50	(d) 3.875–4.50	(d) 3.875– 4.50	(d) 3.875–4.50
Mid-Western (Group 3 basis)	3.375– 4.00	3.375– 4.00	3.375– 4.00	3.375– 4.00	3.375– 4.125
63-66 octane:					
Oklahoma	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25
(a) North Texas	4.125– 4.50	4.25 – 4.50	4.25 – 4.50	4.25 – 4.50	4.25 – 4.50
West Texas	(b)4.25	(b)4.25	(b)4.25	(b)4.25	(b)4.25
Mid-Western (Group 3 basis)	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00
67-69 octane:					
Oklahoma	4.25 – 4.625	4.25 – 4.625	4.25 – 4.625	4.25 – 4.625	4.25 – 4.625
(a) North Texas	4.25 – 4.75	4.375– 4.75	4.375– 4.75	4.375– 4.75	4.375– 4.75
West Texas	(d) 4.50 –5.125	(d)4.50	(d)4.50	(d)4.50	(d)4.50
East Texas	(b)4.25				
Mid-Western (Group 3 basis)	3.875– 4.25	3.875– 4.25	3.875– 4.25	3.875– 4.25	3.875– 4.375
70-72 octane:					
Oklahoma	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
(a) North Texas	4.375– 5.125	4.50 – 5.125	4.50 – 5.125	4.50 – 5.125	4.50 – 5.125
West Texas	(d) 4.75 – 5.00	(d) 4.75 – 5.00	(d) 4.75 –5.00	(d) 4.75 –5.00	(d) 4.75 –5.00
East Texas	(b)4.50	(d) 4.50 –4.75	(d) 4.50 –4.75	(d) 4.50 –4.75	(d) 4.50 –4.75
Mid-Western (Group 3 basis)	4.125– 4.75	4.125– 4.75	4.125– 4.75	4.125– 4.75	4.125– 4.875
Motor Gasoline, 60-64 octane:					
New York harbor	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
Philadelphia district	6.00 – 6.50	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
Baltimore district	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
Motor Gasoline, 65 octane & above:					
New York harbor	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
Philadelphia district	6.00 – 6.50	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25	5.75 – 6.25
Baltimore district	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
U. S. Motor, 58-62°:					
Other districts (Western Penna.)	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00
Motor Gasoline, Min. 65 octane:					
Bradford-Warren (Western Penna.)	6.00 – 6.75	6.00 – 6.75	6.00 – 6.75	6.00 – 6.75	6.00 – 6.75
Motor Gasoline, Min. 70 octane:					
Bradford-Warren (Western Penna.)	(d)6.50	(d)6.50	(d)6.50	(d)6.50	(d)6.50
"Q" Gasoline:					
Bradford-Warren (Western Penna.)	(c&d)6.50–6.75	(c&d)6.50–6.75	(c&d)6.50–6.75	(c&d)6.50–6.75	(c&d)6.50–6.75
Other Districts (Western Penna.)	(c) 6.25– 7.00	(c) 6.25– 7.00	(c) 6.25– 7.00	(c) 6.25– 7.00	(c) 6.25 –7.00

(a) For shipment to Texas and New Mexico destinations: Group 3 prices are quoted on northern shipment. (b) One refiner quoting. (c) To resellers holding licenses. (d) Two refiners quoting.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon except heavy fuel oils in dollars per barrel of 42 gallons, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method. A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Natural Gasoline

(Prices to blenders on freight basis shown below. Shipments may originate in any Mid-Continent manufacturing district.)

Prices Effective	March 20	March 13
F.O.B. GROUP 3		
Grade 26-70	2.50 – 2.625	2.50 – 2.625
F.O.B. BRECKINRIDGE		
Grade 26-70	2.375	2.375
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	6.50 – 6.75	6.50 – 6.75

Kerosine

WESTERN PENNA.		
Bradford-Warren:		
45 gravity w.w.	5.00 – 5.25	5.00 – 5.25
46 gravity w.w.	(e) 5.375–5.50	(e) 5.375–5.50
Other districts:		
45 gravity w.w.	5.00 – 5.25	5.00 – 5.25
46 gravity w.w.	(h)5.125	(h)5.125
47 gravity w.w.	5.25	5.25
CENTRAL MICHIGAN (a)		
47-49 gravity w.w.	5.00 – 5.20	5.00 – 5.20
OKLAHOMA		
41-43 gravity w.w.	3.875– 4.25	3.875– 4.25
42-44 gravity w.w.	4.00 – 4.625	4.00 – 4.625
KANSAS (For Kansas destinations only)		
41-43 gravity w.w.	(e)4.25	(e)4.25
42-44 gravity w.w.	4.375– 4.50	4.375– 4.50
N. TEX. (b)		
41-43 gravity w.w.	4.25 – 4.50	4.25 – 4.50
N. LA. (For shipment to La. and Ark.)		
41-43 gravity w.w.	(h) 4.00 –4.125	(h) 4.00 –4.125
ARK. (F.o.b. Ark. plant of one refiner for shipment to Ark. and La.)		
41-43 gravity w.w.	4.50	4.50
CALIFORNIA		
40-43 gravity w.w.	5.00 – 7.00	5.00 – 7.00

Gas *and* Fuel Oils

WESTERN PENNA.		
Bradford-Warren:		
36-40 gravity	(e)4.625	(e)4.625
Other districts: (Excluding Pittsburgh District Prices)		
36-40 gravity	4.25 – 4.375	4.25 – 4.375
CENTRAL MICHIGAN (a)		
P.W. Distillate	4.50 – 4.75	4.50 – 4.75
No. 3 gas oil, Str.	4.00 – 4.50	4.00 – 4.50
U.G.I. gas oil	3.75 – 4.00	3.75 – 4.00
Fuel Oils (Vis. at 100):		
500-700 Vis.	2.00 – 2.25	2.00 – 2.25
300-500 Vis.	2.25 – 2.50	2.25 – 2.50
100-300 Vis.	2.375– 2.875	2.375– 3.00
OKLAHOMA		
No. 1 prime white	3.50 – 4.00	3.50 – 4.00
No. 1 straw	(h) 3.375–3.625	(h) 3.375–3.625
No. 2 straw	3.25 – 3.625	3.25 – 3.625
No. 2 dark	(h) 3.125–3.25	(h) 3.125–3.25
U.G.I. gas oil	(h) 3.25 –3.375	(h) 3.25 –3.375
28-30 gravity fuel oil	(e)3.25	(e)3.25
28-30 gravity zero fuel	2.75 – 3.25	2.875– 3.25
24-26 gravity fuel	(e) $0.85–$0.90	(e) $0.85–$0.90
14-16 gravity fuel	(e)$0.70	(e)$0.70
No. 6 fuel	(h) $0.35–$0.45	(h) $0.35–$0.45
Range oil	(h) 3.875–4.00	(h) 3.875–4.00
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	3.75 – 4.00	3.75 – 4.00
10-14 gravity fuel oil	$0.45 –$0.80	$0.45 –$0.80
N. TEX. (b)		
No. 1 Prime white	(e)4.00	(e)4.00
N. LA. (For shipment to La. and Ark.)		
20-24 gravity fuel	(e) $1.00–$1.05	(e) $1.00–$1.05
16-20 gravity fuel	(e) $0.80–$0.85	(e) $0.80–$0.85
10-14 gravity fuel	(e) $0.70–$0.75	(e) $0.70–$0.75
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
No. 2 fuel	3.625	3.625
28-30 gravity gas oil, zero	3.125	3.25
Tractor Fuel	(j)4.25	(j)4.25

Prices Effective	March 20	March 13
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.50 –$0.75	$0.50 –$0.75
Light fuel	$0.70 –$0.85	$0.65 –$0.85
Diesel fuel (per gal.)	3.00 – 4.00	2.75 – 4.00
Stove dist. (per gal.)	3.25 – 5.00	3.25 – 5.00
Los Angeles:		
Heavy fuel	$0.43 –$0.90	$0.50 –$0.90
Light fuel	$0.60 –$1.00	$0.60 –$1.00
Diesel fuel (per gal.)	2.50 – 4.00	2.50 – 4.00
Stove dist. (per gal.)	2.75 – 5.00	2.75 – 5.00
San Francisco:		
Heavy fuel	$0.95	$0.95
Light fuel	$1.05	$1.05
Diesel fuel (per gal.)	4.50	4.50
Stove dist. (per gal.)	5.50	5.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)

Viscous Neutrals No. 3 col. (*Viscosity at 70° F.*)

200 Vis. (180 at 100°) 420-425 fl.		
0 p.t.	18.50	18.50
10 p.t.	17.50	17.50
15 p.t.	17.00	17.00
25 p.t.	15.50 –16.25	15.25 –16.25
150 Vis. (143 at 100) 400-405 fl.		
0 p.t.	17.50	17.50
10 p.t.	16.50	16.50
15 p.t.	15.50	15.50
25 p.t.	13.50 –14.25	13.25 –14.25

SOUTH TEXAS

Vis. Color		
Pale Oils: (*Vis. at 100°F.*)		
100 No. 1½-2½	4.50 – 5.00	4.50 – 5.00
200 No. 2-3	6.00 – 6.25	6.00 – 6.25
300 No. 2-3	6.50 – 6.75	6.50 – 6.75
500 No. 2½-3½	7.50 – 7.75	7.50 – 7.75
750 No. 3-4	8.00 – 8.25	8.00 – 8.25
1200 No. 3-4	8.375– 8.75	8.375– 8.75
2000 No. 4	8.50 – 9.25	8.50 – 9.25
Red Oils:		
200 No. 5-6	6.00 – 6.25	6.00 – 6.25
300 No. 5-6	6.50 – 6.75	6.50 – 6.75
500 No. 5-6	7.50 – 7.75	7.50 – 7.75
750 No. 5-6	8.00 – 8.25	8.00 – 8.25
1200 No. 5-6	8.375– 8.75	8.375– 8.75
2000 No. 5-6	8.50 – 9.25	8.50 – 9.25

Note: Red oil prices cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

Pale Oils: (0 to 10 P.P.)		
Vis. Color		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	9.50 –10.00	9.50 –10.00
200—No. 3	10.00 –10.50	10.00 –10.50
250—No. 3	11.00 –11.50	11.00 –11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	(e)9.00	(e)9.00
200—No. 5	9.00 –10.00	9.00 –10.00
280—No. 5	11.50 –11.75	11.50 –11.75
300—No. 5	(h)12.00	(h)12.00

Note: The following oils, of 15 to 25 p.p., are generally quoted these amounts under 0-10 p.p.; viscous oils, 0.5c; non-viscous, 0.25c. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)

Pale Oils 0 to 10 p.p.		
Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50

Prices Effective	March 20	March 13
CHICAGO (Continued)		
Red Oils:		
180—No. 5	9.00	9.00
200—No. 5	9.50	9.50
250—No. 5	10.50	10.50
280—No. 5	11.50	11.50
300—No. 5	11.75	11.75

Note: Viscous oils, 15 to 30 p.p. are quoted 0.5c lower; 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis)

Bright Stocks:		
190-200 Vis. at 210° D.	(e)19.00	(e)19.00
150-160 Vis. at 210°D:		
0 to 10 p.p.	14.25 –16.00	14.25 –16.00
10 to 25 p.p.	13.50 –15.00	13.50 –15.00
25 to 40 p.p.	(h) 13.25–13.50	(h) 13.25–13.50
150-160 vis. at 210° E.	12.50 –14.50	12.50 –14.50
120 Vis. at 210° D		
0 to 10 p.p.	(h) 13.75–14.50	(h) 13.75–14.50
25 to 40 p.p.	(e)12.75	(e)12.75
600 S.R. Dark Green	(e)5.50	(e)5.50
600 S.R. Olive Green	(h) 7.00 –7.50	(h) 7.00 –7.50
631 S.R.	(e)12.50	(e)12.50
Black Oil	(h) 3.50 –4.00	(h) 3.50 –4.00

CHICAGO (Viscosity at 210°)

Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	15.75	15.75
15 to 25 p.p.	14.75	14.75
30 to 40 p.p.	14.25	14.25
E filtered Cyl. Stock	13.50	13.50

Note: To obtain prices delivered in Chicago, add 0.25c per gal.

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)

600 S.R. filterable	8.00 –10.00	8.00 –10.00
650 S.R.	10.00 –11.00	10.00 –11.00
600 fl.	10.50 –12.00	10.50 –12.00
630 fl.	13.00 –14.00	13.00 –14.00
Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:		
10 p.t.	18.00 –19.00	18.00 –19.00
15 p.t.	17.00 –18.00	17.00 –18.00
25 p.t.	15.00 –16.00	15.00 –16.00

Petrolatums

WESTERN PENNA. (In bbls., carloads; in tank cars, 0.5c per lb. less. One refiner reports he equalizes freight with nearest refinery to destination)

Snow White	5.875– 6.125	5.875– 6.125
Lily White	4.875– 5.125	4.875– 5.125
Cream White	3.875– 4.125	3.875– 4.125
Light Amber	2.50	2.50
Amber	2.25	2.25
Red	(e)2.125	(e)2.125

Wax

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only. In bbls., carloads, New York)

122-124 A.m.p., w.c. scale	(h)2.60	2.55
124-126 A.m.p., w.c. scale	2.60	2.55 – 2.60

OKLAHOMA (In bbls. or burlap bags, carloads)

124-126 A.m.p., w.c. scale	(h) 2.60 – 2.70	(h) 2.60 – 2.70

CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)

Fully refined:		
122-124	4.00	4.00
125-127	(i)4.10	(i)4.10
127-129	(i)4.45	(i)4.45
130-132	(i)4.75	(i)4.75
132-134	(i)5.00	(i)5.00
135-137	(i)5.75	(i)5.75

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations: Group 3 prices quoted on northern shipments. (c) Excluding Detroit shipment. (e) One refiner quoting. (f) No price reported. (g) To resellers holding licenses. (h) Two refiners quoting. (i) Same prices quoted in bags or slabs loose. (j) For shipment to Ark. points only. (k) Two suppliers quoting.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Mar. 20, 1939, as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. New Jersey

Essolene
(Regular Grade)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
*Atlantic City, N. J.	6.9	8.7	4	7
*Newark, N. J.	6.9	8.7	4	7
Annapolis, Md.	7.85	9.35	5	8
Baltimore, Md.	7.25	8.75	5	8
Cumberland, Md.	8.65	11.15	5	10
Washington, D. C.	7.5	9	3	9.5
Danville, Va.	8.45	10.95	6	12.9
Norfolk, Va.	7.25	9.75	6	11.5
Petersburg, Va.	7.55	10.05	6	11.7
Richmond, Va.	7.55	10.05	6	8.7
Roanoke, Va.	8.75	11.25	6	11
Charleston, W. Va.	8.05	10.55	6	12.6
Parkersburg, W. Va.	7.35	9.35	6	11.2
Wheeling, W. Va.	8.35	10.25	6	12.2
Charlotte, N. C.	8.65	11.15	7	12.1
Hickory, N. C.	9.15	11.65	7	12.5
Mt. Airy, N. C.	8.95	11.45	7	12.3
Raleigh, N. C.	8.25	10.75	7	11.6
Salisbury, N. C.	8.75	11.25	7	12.2
Charleston, S. C.	7.25	9.75	7	10.6
Columbia, S. C.	8.25	10.75	7	11.6
Spartanburg, S. C.	8.95	11.45	7	12.4

Discount to undivided dealers: thru territory, except New Jersey points, which see in "Note" below: Dealer t.w. price less 0.5c per gal.

*Effective Dec. 1, 1938, S. O. New Jersey posted a minimum retail resale price of 11.2c thru New Jersey, except Trenton area and Cumberland county.

Note: While the above posted prices continue at Atlantic City and Newark, N. J., dealers will pay a net price of 8.2c per gal. for Essolene. Dealers having pumps marked only Esso, Essolene and "Standard" White gasoline will pay 7.7c per gal. for Essolene.

Price basis to commercial consumers on motor fuels, in tank wagon delivery: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.; and

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.; and

Effective Jan. 16, 1939 in North Carolina, and Jan. 23, 1939 in South Carolina, on single deliveries of 50 gals. or more, consumer tank wagon price; single deliveries of less than 50 gals., 4c per gal. over consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals., or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(S. O. New York Division)

Socony Mobilgas
(Regular Grade)

	Consumer Tank Car	"Split" Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	6.5	8.4	*5	7.5
Borough of Richmond (Staten Is.)	6.5	8.4	*5	7.5
Albany, N. Y.	6.5	8.5	5	7.5
Binghamton, N. Y.	7.5	9.5	5	8.25
Buffalo, N. Y.	7	6.8	5	7
Jamestown, N. Y.	7.25	7.9	5	7.5
Plattsburg, N. Y.	7	9.3	5	7.75
Rochester, N. Y.	7.5	8.5	5	8
Syracuse, N. Y.	7	9	5	7.5
Danbury, Conn.	7.25	9.3	4	8
Hartford, Conn.	6.75	8.8	4	7
New Haven, Conn.	6.75	7.5	4	6
Bangor, Me.	6.75	9	5	7.5
Portland, Me.	6.5	8.5	5	7

Socony-Vacuum Oil Co., Cont'd

Boston, Mass.	6.25	8	4	6.75
Concord, N. H.	7.2	9.5	5	7.75
Lancaster, N. H.	8	10.5	5	9
Manchester, N. H.	7.1	9.1	5	7.5
Providence, R. I.	6.25	8.3	4	7
Burlington, Vt.	7	9.2	5	7.75
Rutland, Vt.	7.3	9.5	5	8

*Plus 2% city sales tax computed at time of each sale.

Discount to undivided dealers: 0.5c less than "split" dealer t.w.

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

Atlantic White Flash Gasoline
(Regular Grade)

	Commercial Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Philadelphia Pa.	7	8.5	5	10
Pittsburgh	8	8.5	5	10.5
Allentown	7.5	9	5	10.5
Erie	8	9	5	10
Scranton	7.5	9	5	10.5
Altoona	8	10	5	10.5
Harrisburg	7.5	9	5	10.5
Williamsport	7.5	9	5	10.5
Dover, Del.	...	8.5	5	10.5
Wilmington	...	8.5	5	9.75
Boston, Mass.	...	8	4	7.5
Springfield, Mass.	...	8.8	4	7.5
Worcester, Mass.	...	8.8	4	7
Fall River, Mass.	...	8.5	4	8
Hartford, Conn.	...	8.8	4	7
New Haven, Conn.	...	7.5	4	7
Providence, R. I.	...	8.3	4	7
Atlantic City, N. J.	...	8.2	4	7
Camden, N. J.	...	7.6	4	7
Trenton, N. J.	...	8.2	4	7
Annapolis, Md.	...	9.35	5	9.5
Baltimore, Md.	...	8.75	5	8
Hagerstown, Md.	...	9.85	5	10
Richmond, Va.	...	10.05	6	10.7
Wilmington, N. C.	...	9.85	7	10.8
Brunswick, Ga.	...	8	7	*10.5
Jacksonville, Fla.	...	8	8	10

*Georgia has kerosine tax of 1c per gal., not included in above price.

Discount to undivided dealers: Dealer t.w. less 0.5c per gal. except in Georgia and Florida, dealer t.w. and undivided dealer price is same.

Price basis to commercial consumers: consumers under contract, in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w. delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware, 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

Sohio X-70 Gasoline
(Regular Grade)

	Consumer T.W.	†Divided Dlr.	Gasoline Taxes	Kerosine T.W.
Ohio Statewide	11	10	5	*12
Counties where some prices are below statewide, affecting all or larger portion of county:				
Clermont	11	9	5	....
Butler, Pickaway, Preble and Warren:	10.5	9.5	5	....
Ashland, Carroll, Clinton, Defiance, Fairfield, Franklin, Fulton, Henry, Holmes, Miami, Paulding, Preble, Stark, Tuscarawas, Wayne, Williams and Wood	10	9	5	....
Hamilton	11	9	5	....
Knox	10.5	9	5	....
Lucas	9	7.5	5	....
Clark, Greene and Montgomery:	9.5	8.5	5	....
Allen, Ashtabula, Athens, Auglaize, Belmont, Columbiana, Coshocton, Darke, Erie, Guernsey, Hancock, Hardin, Hocking, Jefferson, Logan, Mahoning, Mercer, Monroe, Morgan, Muskingum, Noble, Ottawa, Perry, Putnam, Sandusky, Seneca, Shelby, Trumbull, Van Wert, Vinton and Washington	10	8.5	5	....

S. O. Ohio Cont'd

Renown Gasoline
(Third Grade)

Ohio Statewide	10.5	9.5	5	....
Counties where some prices are off statewide, affecting all or larger portion of county:				
Carroll, Miami, Pickaway and Preble:	10	9	5	....
Clermont	11	9	5	....
Ashland, Clark, Clinton, Defiance, Fairfield, Franklin, Fulton, Greene, Henry, Holmes, Montgomery, Paulding, Stark, Tuscarawas, Wayne, Williams and Wood	9.5	8.5	5	....
Erie, Ottawa, Sandusky, Seneca:	9.5	8	5	....
Hamilton	11	9	5	....
Allen, Ashtabula, Athens, Auglaize, Belmont, Columbiana, Coshocton, Darke, Guernsey, Hancock, Hardin, Harrison, Hocking, Jefferson, Knox, Logan, Mahoning, Mercer, Monroe, Morgan, Muskingum, Noble, Perry, Shelby, Trumbull, Van Wert, Vinton and Washington:	10	8.5	5	....
Lucas	8.5	7	5	....

Kerosine Prices
(Off Statewide Level)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull and Van Wert *11.5

Paulding and Wyandotte *11

Ashtabula *10.5

Fayette, Madison, Pickaway, Portage and Summit *8.5

†This price also to authorized agents, exclusive of 0.5c rental. Discount to undivided dealers: 0.5c less than divided dealer t.w.

*Ohio has kerosine tax of 1c per gal. not included in above prices.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio except in counties listed below, on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The counties where Q.D.A. differs from statewide are: Allen, Ashtabula, Auglaize, Butler, Champaign, Clinton, Columbiana, Cuyahoga, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Hancock, Hardin, Henry, Highland, Lake, Logan, Lorain, Lucas, Mahoning, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Trumbull, Union, Van Wert, Warren, Williams and Wood.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

Crown Gasoline
(Regular Grade)

	Consumer T.W.	Net Dlr.	Gasoline Taxes	Kerosine T.W
Covington, Ky.	11.5	8.5	6	9.5
Lexington, Ky.	13	10	6	10
Louisville, Ky.	11.5	8.5	6	9
Paducah, Ky.	12.5	9.5	6	9
Jackson, Miss.	10.5	7.5	7	*9
Vicksburg, Miss.	12	9	7	*8.5
Birmingham, Ala.	12	9	*8	8.5
Mobile, Ala.	12	9	*9	8.5
Montgomery, Ala.	12	10	*9	*9.5
Atlanta, Ga.	11.5	8.5	7	*7.5
Augusta, Ga.	12.5	9.5	7	*8
Macon, Ga.	12	9	7	*9
Savannah, Ga.	10.5	7.5	7	*7
Jacksonville, Fla.	11	8	8	8
Miami, Fla.	11	8	8	8
Pensacola, Fla.	11	8	*9	8
Tampa, Fla.	11	8	8	8

Kyso Gasoline
(Third Grade)

Covington, Ky.	10	7.5	6	....
Lexington, Ky.	11.5	9	6	....
Louisville, Ky.	10	7.5	6	....
Paducah, Ky.	10.5	8	6	....
Jackson, Miss.	8.5	6	7	....
Vicksburg, Miss.	10	7.5	7	....
Birmingham, Ala.	10	7.5	*8	....
Mobile, Ala.	9.5	7	*9	....
Montgomery, Ala.	11	8.5	*9	....
Atlanta, Ga.	10	7.5	7	....
Augusta, Ga.	11	8.5	7	....
Macon, Ga.	10	7.5	7	....
Savannah, Ga.	8.5	6	7	....
Jacksonville, Fla.	9.5	7	8	....
Miami, Fla.	9.5	7	8	....
Pensacola, Fla.	9.5	7	*9	....
Tampa, Fla.	9.5	7	8	....

Above prices include these inspection fees on both gasoline and kerosine unless otherwise specified, per gallon, figured on basis of 50 gallons per barrel:

Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel, 1/20c per gal. in bulk; Florida 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline, 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. lots of more than 50 in bbls., 1/5c in lots less than 50 bbls.; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 3/100c.

Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Mar. 20, 1939, as posted by principal marketing companies at their headquarters offices, but subject to later correction.

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month

**Taxes*: In the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery, 1c city and 1c county; Pensacola, 1c city. Georgia and Montgomery, Ala. have kerosine taxes of 1c per gal., and Mississippi 0.5c, not included in above prices.

S. O. Indiana

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown	Stano-lind	Gaso-line Taxes	Kero-sine T.W.
Chicago, Ill.	11.1	8.1	6.4	4	10
Decatur, Ill.	11.1	8.6	8	4	10
Joliet, Ill.	11.1	8.6	8.4	4	10
Peoria, Ill.	11.1	9.1	8.5	4	10
Quincy, Ill.	10.9	8.9	6.7	4	8.7
Indianapolis, Ind.	11.8	10.3	8.9	5	*10
Evansville, Ind.	11.6	10.1	8.5	5	*10.5
South Bend, Ind.	12.1	10.6	9.2	5	*9
Detroit, Mich.	9.1	7.6	7.1	4	7.1
Grand Rapids, Mich.	10	8.5	8	4	9.7
Saginaw, Mich.	11.8	10.3	8.8	4	9.3
Green Bay, Wis.	11.9	10	9	5	10.3
Milwaukee, Wis.	9.9	8.4	7.3	5	10.2
La Crosse, Wis.	11.5	10	9.5	5	10.4
Minneapolis-St. Paul	11.5	10	9	5	10.4
Duluth, Minn.	11.9	10.4	9.4	5	10.8
Mankato, Minn.	11.5	10	9.5	5	9.4
Des Moines, Ia.	10.9	9.4	8	4	*9.8
Davenport, Ia.	11.1	9.6	9.1	4	*10
Mason City, Ia.	11.3	9.8	9.3	4	*10.2
St. Louis, Mo.	10.2	8.7	7.5	*4	8
Kansas City, Mo.	10.4	8.4	6.9	*4	8
St. Joseph, Mo.	10.4	8	6.9	*4	9.3
Fargo, N. D.	12.7	11.2	10.7	4	11.6
Huron, S. D.	12	10.5	10	5	10.9
Wichita, Kans.	9.9	7.1	6	4	7.8

**Taxes*: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax. Kerosine taxes: Indiana has 4c, Iowa 3c per gal. state tax, not included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices; all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gaso-line Taxes	Kero-sine T.W.
Omaha, Neb.	11.5	8.5	6	10.3
McCook	11.5	9.5	6	10
Norfolk	11.9	8.9	6	10.7
North Platte	12.3	9.4	6	11
Scottabluff	11	8.9	6	11.2

Discounts to commercial consumers: for tank wagon delivveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

Essolene
(*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gaso-line Taxes	Kero-sine T.W.
Little Rock, Ark.	7.25	9.75	7.5	10
Alexandria, La.	6.75	9 25	8	*11.5
Baton Rouge, La.	6.75	9.25	8	*9.5
New Orleans, La.	6.75	9.25	*10	*9
Lake Charles, La.	6.75	9.25	8	*11.5
Shreveport, La.	5.5	8	8	*10
Lafayette, La.	7	9.5	8	*11.5
Bristol, Tenn.	10.25	9	8	14.5
Chattanooga, Tenn.	9.5	11	8	14
Knoxville, Tenn.	10	12.5	8	14.5
Memphis, Tenn.	8	10.5	8	12.5
Nashville, Tenn.	9	11.5	8	12

**Taxes*: New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana has kerosine tax of 1c per gal.; in addition New Orleans has 1c parish tax, none of which are included in above prices.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory: commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

Humble Motor Fuel
(*Regular Grade*)

	*T.W.	S.S.	Gaso-line Taxes	Kero-sine T.W.
Dallas, Tex.	7	11	5	8
Ft. Worth, Tex.	7	11	5	7
Houston, Tex.	8	12	5	8
San Antonio, Tex.	9	13	5	8

U. S. Motor Gasoline
(*Third Grade*)

Dallas, Tex.	6	9	5
Ft. Worth, Texas	6	9	5
Houston, Tex.	6	..	5
San Antonio, Tex.	6	..	5

Thriftane
(Leaded, 67 Octane, Purple Gasoline)

Houston	7	10	5
San Antonio	8	11	5

*Price is t.w. price to all classes of dealers and consumers.

Continental Oil

Conoco Bronze (*Regular Grade*)
Demand (*Third Grade*)

	—Dealer Prices— Conoco Bronz-z-z	De-mand	Gaso-line Taxes	Kero-sine ‡T.W.
Denver, Colo.	10.5	9.5	5	11.5
Grand Junc., Colo.	13	12	5	15
Pueblo, Colo.	9	8	5	10.5
Casper, Wyo.	12	11	5	11.5
Cheyenne, Wyo.	11	10	5	13
Billings, Mont.	12	10	6	13
Butte, Mont.	13.5	10.5	6	15.5
Great Falls, Mont.	12	10	6	15.5
Helena, Mont.	13	11	6	15.5
Salt Lake City, Utah	11	10	5	16
Boise, Ida.	**13.1	**10.6	6	18
Twin Falls, Ida.	**13.6	**12.6	6	18
Albuquerque, N. M.	9.5	7.5	†6.5	10
Roswell, N. M.	8	6.5	†6.5	8
Santa Fe, N. M.	9.5	8.5	*7	10.5
Muskogee, Okla.	8	6.5	5	7
Oklahoma City, Okla.	6	4.5	5	6.5
Tulsa, Okla.	5.5	4.5	5	6.5
Ft. Smith, Ark.	8.25	5.75	5	7.5
Little Rock, Ark.	9.25	6	7.5	8
Texarkana, Ark.	7	6	5	8

†Includes city tax of 0.5c.
*Includes 1c city tax.
‡Prices are in t.w. deliveries to consumers and dealers.
**Prices include 0.1c to cover 1-mill tax for toll bridges.

S. O. California

Standard Gasoline
(*Regular Grade*)

	T.W.	S.S.	Gaso-line Taxes	Kero-sine T.W.
San Francisco, Cal.	13.5	14.5	4	11.5
Los Angeles, Cal.	13	14	4	10
Fresno Cal.	14.5	15.5	4	12.5
Phoenix, Ariz.	15.5	16.5	6	*12.5
Reno, Nev.	15.5	16.5	5	13.5
Portland, Ore.	14	15	6	13.5
Seattle, Wash.	14	15	6	13.5
Spokane, Wash.	17	18	6	16.5
Tacoma, Wash.	14	15	6	13.5

Flight Gasoline
(*Third Grade*)

San Francisco, Cal.	12	13	4	....
Los Angeles, Cal.	11.5	12.5	4	....
Fresno, Cal.	13	14	4	....
Reno, Nev.	14	15	5	....
Phoenix, Ariz.	12	13	6	....
Portland, Ore.	12.5	13.5	6	....
Seattle, Wash.	12.5	13.5	6	....
Spokane, Wash.	15.5	16.5	6	....
Tacoma, Wash.	12.5	13.5	6	....

*Arizona has kerosine tax of 5c per gal., not included in above prices.

Discount to dealers, thru territory: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers in California only; 2c; on Flight gasoline, 100% dealers, 2c; and split dealers in California only; 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over. Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price. Discounts on kerosine: in tank cars, 3c off tank truck price; plant deliveries to jobbers, 2.5c below tank truck price.

Canada

PRICES OF IMPERIAL OIL LTD.
Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline
(*Regular Grade*)

	T.W.	Gasoline Taxes	Kerosine T.W.
Hamilton, Ont.	15	6	15.5
Toronto, Ont.	15	6	15.5
Brandon, Man.	21	7	22
Winnipeg, Man.	19.5	7	20.5
Regina, Sask.	19	7	21
Saskatoon, Sask.	21.3	7	23.3
Edmonton, Alta.	19.5	7	21.5
Calgary, Alta.	16.5	7	18.5
Vancouver, B. C.	16	7	23
Montreal, Que.	14	6	14.5
St. John, N. B.	13.5	10	17.5
Halifax, N. S.	13.5	10	17.5

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car, tank wagon or dealer prices, as indicated, of aviation gasoline in several marketing territories.

S. O. OHIO
Thru Ohio
Esso Aviation

	Consumer T.W.	Gasoline Taxes
74 octane	15.5	5
80 octane	16.5	5
87 octane	17.5	5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above.

S. O. INDIANA
Stanavo Ethyl Aviation Gasoline
73 Octane Number

Chicago, Ill.	14.9
Detroit, Mich.	16.5 4
Milwaukee, Wis.	15.1 5
Minneapolis, Minn.	15.3 5
St. Louis, Mo.	14.5 3
Kansas City, Mo.	14.2 *4
Fargo, N. D.	16.5 4
Huron, S. D.	15.8 5

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.
Aviation Gasoline

	Tank Car
Baytown, Tex.	8.5

CONTINENTAL OIL CO.
Conoco Special Gasoline

	Dealer Price	Gasoline Taxes
Denver, Colo.	14.5	5
Cheyenne, Wyo.	15	5
Helena, Mont.	16	6
Salt Lake City, Utah	17.5	5
Albuquerque, N. M.	14	*6.5

*Includes city tax of 0.5c.

S. O. CALIFORNIA
Stanavo Aviation Gasoline

	T.W.	
Phoenix, Ariz.	17.5	6
Los Angeles, Cal.	15	4
San Francisco, Cal.	15.5	4
Reno, Nev.	17.5	5
Portland, Ore.	16	6
Seattle, Wash.	16	6
Spokane, Wash.	10	6

Note: For discounts, etc., see note under Standard and Flight gasoline above.

Naphtha (In Tank Wagon)

S. O. NEW JERSEY
Posted Tank Wagon Prices

	Mineral Spirits	FV.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	10.5	12
*New York City	9.5	10.5
Rochester, N. Y.	12	12
Syracuse, N. Y.	12	14.5
Boston, Mass.	11	11
Bridgeport, Conn.	11	11.5
Hartford, Conn.	10.5	11
Providence, R. I.	11	12

*Prices apply to consumers only in quantities over 1,000 gals. annually. For quantities under 1,000 gals. annually, add 0.5c per gal.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnoles. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnoles. These prices in effect Mar. 20,* **1939,** *as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	12.5	13.5

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers off t.w. price; 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c: 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

S. O. INDIANA

(Prices include state and federal taxes)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill.	16.2	16.5	15.9
Detroit, Mich.	19.2	18.2	19.7
Kansas City, Mo.	13.9	14.9	14.4
St. Louis, Mo.	14.2	15.2	12.9
Milwaukee, Wis.	18.8	19.8	19.3
Minneapolis, Minn.	19	20	17.7

Note: All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	10.5	9.5
New York Harbor	10	9
Philadelphia district	10.5	9
Boston	10.5	9.5
Providence	10.5	9.5
†Ohio points, delivered	8.5	*8

*This is on rubber solvent.

†In Ohio, prices on D.C. naphtha and special Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.125c less than on V.M.&P.

Price Changes

Dates and amounts of changes. See table for full current prices.

Socony-Vacuum-Socony Mobilgas:
Correction: Split dealer t. w. price at Syracuse has been 9c since Feb. 27, and at Boston 8c, since Feb. 24, and these prices should have been published on page 42 of the March 15 issue, instead of those shown thru printer's error.
Buffalo t. c. cut 0.25c, March 8.

Kerosine:
Manchester t. w. cut 0.25c, Feb. 27.

S. O. Ohio—Sohio X-70 Gasoline:
T. w. and dealer prices cut 1c, thru Athens and Guernsey counties, March 11; similar cut, thru Perry county, March 14; dealer prices only cut 0.5c, these 3 counties, March 16.
T. w. cut 2c, dealer prices cut 1.5c, Hardin county, March 14; t. w. only up 1c, March 20.
T. w. only up 0.5c, Ashtabula, Columbiana, Mahoning and Trumbull counties, March 15.
Dealer prices only cut 0.5c, Coshocton and Muskingum counties, March 16.
T. w. only up 0.5c, Washington county, March 16.
T. w. cut 1c, dealer prices cut 1.5c, thru Belmont, Harrison, Jefferson, Monroe, Morgan, Noble and Vinton counties, March 16.
T. w. and dealer prices cut 1c, Holmes county, March 16.
T. w. cut 1c, dealer prices cut 1.5c, Hocking county, March 16.
T. w. and dealer prices cut 1c, Erie, Ottawa, and Sandusky counties, March 16; dealer prices only cut 0.5c, March 18.
T. w. cut 1c, dealer prices cut 1.5c, Seneca county, March 18.
T. w. only up 1c, thru Allen, Auglaize, Darke, Hancock, Logan, Mercer, Putnam, Shelby and Van Wert counties, March 20.

Renown Gasoline:
T. w. cut 1.5c, dealer prices 1c, thru Hardin county, March 14; t. w. only up 1c, March 20.
T. w. and dealer prices cut 1c, thru Athens, Guernsey and Perry counties, March 14; t. w. only up 0.5c, March 16.
T. w. only up 0.5c, Ashtabula, Columbiana, Coshocton, Mahoning, Muskingum, Trumbull and Washington counties, March 15.
T. w. cut 0.5c, dealer prices cut 1c, thru Belmont, Harrison, Jefferson, Monroe, Morgan, Noble and Vinton counties, March 16.
T. w. and dealer prices cut 1c, thru Holmes county, March 16.
T. w. cut 0.5c, dealer prices cut 1c, Hocking county, March 16.
T. w. and dealer prices cut 1c, thru Erie, Ottawa, and Sandusky counties, March 16; dealer prices only cut 0.5c, March 18.
T. w. cut 1c, dealer prices 1.5c, Seneca county, March 18.
T. w. only up 1c, Allen, Auglaize, Darke, Hancock, Logan, Mercer, Putnam, Shelby and Van Wert counties, March 20.

Atlantic Refining—Atlantic White Flash:
Pittsburgh dealer t. w. cut 1c, March 10.

(Continued in next column)

Harrisburg t. c. and dealer t. w. up 0.5c, March 17.
Brunswick dealer t. w. cut 0.75c, March 15.

Kerosine:
Worcester t. w. cut 0.5c, March 15.
Baltimore t. w. cut 0.5c, March 9.
Richmond t. w. up 2c, March 14.

S. O. Kentucky—Crown Gasoline:
Mobile up 0.5c, March 10.
Atlanta cut 1c, March 8.
Savannah cut 1.5c, March 8.

Kyso Gasoline:
Atlanta cut 1c, March 8.
Savannah cut 2c, March 8.

S. O. Indiana—Motor Gasolines, Kerosine, Tractor Fuel and Furnace Oil:
Only points affected March 16, were, each being up 0.5c:
Minneapolis, gasoline and kerosine; Des Moines and Duluth, Stanolind dealer only; Mankato, kerosine only; and Kansas City and Wichita, Stanolind dealer and kerosine.
St. Joseph Red Crown dealer up 0.8c, Stanolind dealer up 0.9c, March 8.
Minot, N. D. has been deleted from price table.

S. O. Louisiana—Essolene:
Bristol dealer t. w. up 1.75c, March 16.

Humble Oil & Refining—Humble Motor Fuel:
Ft. Worth t. w. and s. s. up 1c, March 13.
Dallas t. w. and s. s. up 1c, March 14.

U. S. Motor Fuel:
Ft. Worth t. w. up 0.5c, s. s. up 1c, March 13.
Dallas t. w. up 0.5c, s. s. up 1c, March 14.

Continental Oil—Conoco Bronz-z-z and Demand Gasolines:
Dealer t. w. prices at or below 12.5c, including tax, for Conoco Bronz-z-z, and at or below 11c for Demand, in Oklahoma, advanced 0.5c, March 16.
T. w. and dealer prices up 0.1c, thru Idaho, to cover 1-mill per gal. tax levy on motor fuel for toll bridges March 14.
Grand Junction up 2c, March 7.
Cheyenne and Pueblo up 1c, March 17.

Kerosine:
Dealer t. w. prices below 6.5c in Oklahoma, advanced 0.5c, March 16.

'Gas' Prices in 50 Cities

Following data on retail gasoline prices in 50 U. S. cities, as of March 1, 1939, was obtained from sources deemed reliable, but N. P. N. assumes no responsibility for their accuracy:

	Net Dealer Price	Indicated Dlr. Margin	Total "Gas" Tax*	Apparent Prevlg. Posted Retail Price, Incl. Tax
	(Figures in cents per gallon)			
Portland, Me.	8.0	3.70	5.0	16.7
Manchester	8.60	3.40	5.0	17.0
Burlington, Vt.	8.70	4.0	5.0	17.7
Boston	7.50	2.0	4.0	13.5
Providence	7.80	3.20	4.0	15.0
Hartford	8.30	3.20	4.0	15.5
Buffalo	8.0	3.0	5.0	16.0
New York	7.90	3.40	5.0	16.3
Newark	7.70	3.50	4.0	15.2
Philadelphia	8.0	2.0	5.0	15.0
Dover, Del.	8.0	2.0	5.0	15.0
Baltimore	8.25	2.55	5.0	15.8
Washington	8.5	4.0	3.0	15.5
Chastn., W.Va.	10.05	4.05	6.0	20.1
Norfolk, Va.	9.25	4.55	6.0	19.8
Charlotte, N.C.	10.65	4.05	7.0	21.7
Chastn., S. C.	8.75	3.75	7.0	19.5
Atlanta	9.50	3.50	7.0	20.0
Jacksonville	8.0	3.0	8.0	19.0
Birmingham	9.0	4.0	8.0	21.0
Vicksburg	9.0	5.0	7.0	21.0
Memphis	10.0	4.80	8.0	22.8
Lexington, Ky.	10.0	3.50	6.0	19.5
Youngstown, O.	8.0	3.0	5.0	16.0
South Bend	10.60	3.40	5.0	19.0
Chicago	8.10	3.40	4.0	15.5
Detroit	7.60	2.60	4.0	14.2
Milwaukee	8.40	3.30	5.0	16.7
St. Paul-Minneapolis	9.50	3.50	5.0	18.0
Fargo, N. D.	11.20	3.50	4.0	18.7
Huron, S. D.	10.30	4.40	5.0	19.7
Omaha	8.50	3.0	6.0	17.5
Des Moines	9.40	4.30	4.0	17.7
St. Louis	8.70	3.50	4.0**	16.2
Wichita	6.60	3.30	4.0	13.9
Tulsa	5.0	4.0	5.0	14.0
Little Rock	9.25	4.25	7.50	21.0
New Orleans	8.75	4.05	10.0†	22.8
Houston	8.0	4.50	5.0	17.5
Albuquerque	9.50	4.50	6.50‡	20.5
Denver	10.50	4.50	5.0	20.0
Casper, Wyo.	12.0	5.0	5.0	22.0
Butte, Mont.	13.50	4.50	6.0	24.0
Boise, Ida.	13.0	4.0	6.0	23.0
Salt Lake City	11.0	4.0	5.0	20.0
Reno, Nev.	12.50	4.0	5.0	21.5
Phoenix, Ariz.	12.50	4.0	6.0	22.5
San Francisco	10.50	4.0	4.0	18.5
Portland, Ore.	11.0	4.0	6.0	21.0
Spokane, Wash.	14.0	4.0	6.0	24.0
Avg. 50 Cities	9.35	3.69	5.44	18.48

*Including 1c federal tax. **Includes 1c city tax. †Includes 2c city tax. ‡Includes 0.5c city tax.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect March 20, 1939

Following are posted tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

S. O. NEW JERSEY

	No. 1	No. 2	No. 4
Atlantic City, N. J.	7.0	5.75	5.75
Newark	7.0	5.75	5.75
Annapolis, Md.		6.5	....
Baltimore	7.0	6.5	6.0
Washington, D. C.	7.25	6.75	6.75
Norfolk, Va.	7.0	6.0	6.0
Petersburg	7.25	6.25	....
Richmond	7.25	6.25	6.25
Charlotte, N. C.	8.75	7.75	....
Hickory	....	8.25	....
Raleigh	8.75	7.25	....
Charleston, S. C.	8.5	7.0	....
Columbia	9.5	8.0	....
Spartanburg	10.2	8.7	....

SOCONY-VACUUM OIL CO. INC.
(S. O. New York Division)

	No. 2	No. 3	No. 4
New York City	5.75	5.75	5.75
Albany, N. Y.	5.75	5.75	5.75
Rochester, N. Y.	7.00	7.00	7.00
Boston, Mass.	5.75	5.75	5.75
Bangor, Me.	6.50	6.50	6.50
Manchester, N. H.	6.00	6.00	6.00
Burlington, Vt.	6.75	6.75	6.75
Hartford, Conn.	6.00	6.00	6.00
New Haven, Conn.	5.50	5.50	5.50
Providence, R. I.	5.75	5.75	5.75

Note: Prices for No. 1 fuel in Socony-Vacuum territory same as for kerosine which see in tank wagon table for various cities; prices change with kerosine.

ATLANTIC REFINING

	Numbers 1	2	3	4	5	6
Phila., Pa.	7.75	6.0	6.0	6.0	3.25	2.50
Allntn., Pa.	8.5	6.5	6.5	6.5	....	....
Wlmgtn., Del.	7.75	5.5	5.5	5.5	....	....
Sprngfld., Ms.	7.5	6.0	....	....	....	....
Wrestr., Ms.	7.0	5.50	....	5.50	....	....
Hrtfd., Conn.	7.0	6.0	....	6.0	....	....

S. O. OHIO

	No. 1	No. 2	No. 3
Columbus Division and Cleveland	7.50	7.50	7.00
City of Lima	8.00	8.00	7.00
Rest of Ohio	8.00	8.00	7.50

Note: S. O. Ohio prices are for full compartment hose dumps, bucket dumps are 0.5c per gallon higher.

S. O. INDIANA
Stanolex Fuel and Furnace Oils

	No. 1 Fuel	Stanolex Furnace
Chicago	(a)6.75	6.75
Indianapolis	...	(b)7.8
Detroit	...	7.1
Milwaukee	8.4	7.7
Minneapolis	7.8	7.8
St. Louis	7.7	(c)6.7
Kansas City	6.8	6.8

(a) For 400 gals. and over; 150 to 399 gals., 7.25c; 1 to 149 gals., 8.25c.
(b) Excluding 4c state tax.
(c) For 400 gals. & over; 100 to 399 gals., 7c; 1 to 99 gals., 8c.
Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b. refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-337; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	March 20	
District:	60-64 Oct.	65 Oct. & Above
N. Y. harbor	5.75 – 6.25	5.75 – 6.25
(b)N. Y. harbor	5.50 – 6.00	5.50 – 6.00
Philadelphia	5.75 – 6.25	5.75 – 6.25
Baltimore	5.75 – 6.25	5.75 – 6.25
Norfolk	6.50 – 7.00	6.50 – 7.00
Wilmington, N. C.	6.50 – 7.00	6.50 – 7.00
Charleston, S. C.	6.50 – 7.00	6.50 – 7.00
Savannah	6.50 – 7.00	6.50 – 7.00
Jacksonville	6.00 – 7.00	6.50 – 7.00
Portland	6.25 – 6.50	6.50 – 7.00
Boston	5.875– 6.25	5.875– 6.25
Providence	5.875– 6.25	5.875– 6.25

WATER WHITE KEROSINE

District:			
N. Y. harbor	4.50 –4.75	Charleston	5.00–5.25
(b) N. Y. harbor	4.375–4.50	Savannah	5.00–5.25
Philadelphia	4.75–5.00	Jacksonville	5.00–5.25
Baltimore	5.00–5.25	Portland	4.625
Norfolk	5.00–5.25	Boston	4.40–4.50
Wilmington, N. C.	5.00–5.25	Providence	4.40–4.50

(c) FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	4.50 – 4.75	4.375– 4.50
Nos. 2-3	3.75 – 4.00	3.625– 4.00
No. 4	3.75 – 4.00	3.50 – 4.00
No. 5	(a)$1.15	.....
No. 6	$0.95	.....

	Phila. dist.	Balt. dist.
No. 1	4.75 – 5.00	5.00 – 5.25
Nos. 2-3	4.25	4.25
No. 4	4.00 – 4.25	4.00 – 4.25
No. 5	$1.15	$1.15
No. 6	$0.95	$0.95

	Bost. dist.	Prov. dist.
No. 1	4.40 – 4.50	4.40 – 4.50
Nos. 2-3	3.90 – 4.25	4.00 – 4.25
No. 4	3.90 – 4.25	4.00 – 4.25
No. 5	$1.25	$1.15
No. 6	$0.95	$0.95

District:	(d)Bunker C Fuel	(d) Diesel Oil
N. Y. harbor	(f)$0.95	(g)$1.65
Philadelphia	(f)$0.95	(g)$1.65
Baltimore	(f)$0.95	(e)$1.65
Norfolk	(e)$0.95	$1.65
Charleston	$0.90	$1.65
Savannah	(e)$0.90	$1.785
Jacksonville	(e)$0.90	$1.785
Tampa	(e)$0.85	$1.785
Portland	$1.05	$1.75
Boston	(f)$0.95	(g)$1.65
Providence	$0.95	$1.65

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	3.75 – 4.00	3.75 – 4.00
Philadelphia dist	4.25	....
Baltimore dist	4.25	....
Norfolk dist	4.25	....
Savannah dist	....	4.25
Jacksonville dist	....	4.25

Pacific Export

(i) (Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	March 20	March 13
U. S. Motor, under 65 oct.	4.375– 4.50	4.375– 4.50
400 e.p. blend, under 65 oct.	4.50 – 4.625	4.50 – 4.625
400 e.p. blend 65 oct. & above	4.75 – 4.875	4.625– 4.75
(h) 38-40 gravity, w.w. kerosine	4.25 – 4.50	4.25 – 4.50
41-43 gravity, w.w. kerosine	4.50 – 4.75	4.50 – 4.75
44 gravity, w.w. kerosine	5.00 – 5.25	5.00 – 5.25
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$0.95 –$1.05	$0.95 –$1.05
Diesel fuel, under 24°	$0.875–$0.95	$0.875–$0.95
(j) 30-34 gravity, diesel (gas oil)	$1.05 –$1.25	$1.05 –$1.25
(k) Grade C fuel oil	$0.65 –$0.70	$0.65 –$0.70

Prices Effective	March 20	March 13
In Ships' Bunkers, or deep tank lots, per bbl.:		
(j)Diesel fuel oil	$1.40 –$1.55	$1.40 –$1.55
(k)Grade C fuel oil	$0.70 –$0.90	$0.70 –$0.90
Cased Goods: (Per case)		
U. S. Motor	$1.40 –$1.50	$1.40 –$1.50
400 e.p. blend, under 65 octane	$1.50 –$1.60	$1.50 –$1.60
375-400 e.p. blend, 65 oct. & above	$1.60 –$1.70	$1.60 –$1.70
(h)40-43 gravity, w.w. kerosine	$1.30 –$1.40	$1.30 –$1.40
Kerosine, p.w.	$1.25 –$1.35	$1.25 –$1.35

New York Export

(Cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:		
Light, 25 p.t.	22.50	22.50
Neutral oil:		
200 3 color, 25 p.t.	23.00	22.75
150 3 color, 25 p.t.	21.00	20.75
600 s.r., unfiltered	15.50	15.50
650 s.r., unfiltered	16.50	16.50
600 fl., s.r.	18.00	18.00
630 fl., s.r.	20.50	20.50

Wax, Domestic *and* Export

(A.S.T.M. Tests. Melting points, however, are A.M.P., 3° higher than E.M.P. Export prices, f.a.s., carloads. Domestic prices, f.o.b. refineries in New Orleans & New York districts in bags, carloads, with 0.2c discount allowed for shipment in bulk, except where noted below. Scale solid; fully refined, slabs in bags)

Prices Effective	March 20	
	New York	
	Domestic	Export
124-6 Y.C. scale	2.65 – 2.75	2.65 – 2.75
122-4 W.C. scale	2.65 – 2.75	2.65 – 2.75
124-6 W.C. scale	2.65 – 2.75	2.65 – 2.75
123-5 Fully rfd.	3.75	3.375
125-7 Fully rfd.	3.90	3.50 – 3.625
128-30 Fully rfd.	(l)4.00	3.65 – 3.75
130-2 Fully rfd.	(l)4.35	4.00
133-5 Fully rfd.	(l)4.65	4.40 – 4.50
135-7 Fully rfd.	(l)4.90	4.75 – 5.00
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	2.65 – 2.75	2.65 – 2.75
122-4 W.C. scale	2.65 – 2.75	2.65 – 2.75
124-6 W.C. scale	2.65 – 2.75	2.65 – 2.75
123-5 Fully rfd.	3.75	3.375
125-7 Fully rfd.	3.90	3.50 – 3.625
128-30 Fully rfd.	(l)4.00	3.65 – 3.75
130-2 Fully rfd.	(l)4.35	4.00
133-5 Fully rfd.	(l)4.65	4.40 – 4.50

Gulf Coast

(F.o.b. ship, Gulf oil terminals; minimum 20,000 bbls.; representing traders' opinions)

Prices Effective	March 20	March 13
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	4.25 – 4.50	4.25 – 4.50
60-64 oct.	4.25 – 4.625	4.25 – 4.625
65-67 octane	4.50 – 4.875	4.50 – 4.875
68-70 octane	4.875– 5.125	4.875– 5.125
FUEL OILS		
No. 1	3.625– 4.00	3.625– 4.00
No. 2	3.125– 3.375	3.125– 3.375
KEROSINE		
41-43 gravity, w.w.	3.75 – 4.00	3.75 – 4.00

For Export Shipment:

GASOLINE

Gasoline:	March 20 60-62 Gravity, 400 e.p.	61-63 Gravity, 390 e.p.	64-66 Gravity, 375 e.p.
60 octane	4.25 – 4.375	4.25 – 4.375	4.25 – 4.375
61 octane	4.25 – 4.40	4.25 – 4.40	4.25 – 4.40
62 octane	4.25 – 4.45	4.25 – 4.45	4.25 – 4.45
63 octane	4.375– 4.50	4.375– 4.50	4.375– 4.50
64 octane	4.375– 4.55	4.375– 4.55	4.375– 4.55
65 octane	4.50 – 4.75	4.50 – 4.75	4.50 – 4.75
66 octane	4.625– 4.75	4.625– 4.75	4.625– 4.75
67 octane	4.625– 4.875	4.625– 4.875	4.625– 4.875
68 octane	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00
70 octane	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50

Prices Effective	March 20	March 13
For Export Shipment:		
KEROSINE		
44 gravity, w.w.	4.125– 4.25	4.125– 4.25
41-43 gravity, w.w.	3.75 – 4.00	3.75 – 4.00
41-43 gravity, p.w.	3.75 – 4.00	3.75 – 4.00
GAS AND BUNKER OILS		
For Export Shipment:		
Gas Oil (m):		
Below 43 diesel index	3.125– 3.25	3.125– 3.25
43-47 diesel index	3.25 – 3.50	3.25 – 3.50
48-52 diesel index	3.375– 3.625	3.375– 3.625
53-57 diesel index	3.50 – 3.75	3.50 – 3.75
58 & above	3.625– 3.875	3.625– 3.875
For Domestic or Export Shipment:		
Diesel Oil Ship's bkrs.	(o)$1.45	(o)$1.45
Grade C bunker oil for ship's bunkers	(o)$0.75	(o)$0.75
Grade C bunker oil, in cargoes	$0.675–$0.70	$0.675–$0.70

MID-CONTINENT LUBRICATING OILS

(Cents per gal. at Gulf; in bbls., f.a.s.; in bulk, f.o.b terminals)

	March 20 (p) Barrels	Bulk
190-200 vis. D. 210 brt. stock	21.50 –22.50	17.60 –17.80
150-160 vis. D 210 brt. stock:		
0-10 p.p.	18.00 –18.25	13.00 –14.30
10-25 p.p.	17.50 –17.75	12.50 –14.25
150-160 vis. E. 210 brt. stock	17.25 –17.50	13.00 –14.50
120 vis. D 210 brt. stock	17.25 –17.50	13.00 –14.50

	March 20 Bulk	March 13 Bulk
180 vis. No. 3 color neutral:		
0-10 p.p.	9.80 –10.50	9.80 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
200 vis. No. 3 color neutral:		
0-10 p.p.	10.30 –10.50	10.30 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b. terminals.)

Unfiltered Pale Oils:			
Vis.	Color		
100	No. 3	4.50 – 4.75	4.50 – 4.75
200	No. 3	6.00 – 6.25	6.00 – 6.25
300	No. 3	6.50 – 6.75	6.50 – 6.75
500	No. 3½	7.50	7.50
750	No. 4	8.00 – 8.25	8.00 – 8.25
1200	No. 4	8.375– 8.75	8.375– 8.75
2000	No. 4	8.50 – 9.00	8.50 – 9.00
Red Oils:			
Vis.	Color		
100	No. 5-6	4.50 – 4.75	4.50 – 4.75
200	No. 5-6	6.00 – 6.25	6.00 – 6.25
300	No. 5-6	6.50 – 6.75	6.50 – 6.75
500	No. 5-6	7.50	7.50
750	No. 5-6	8.00 – 8.25	8.00 – 8.25
1200	No. 5-6	8.375– 8.75	8.375– 8.75
2000	No. 5-6	8.50 – 9.00	8.50 – 9.00

Note: Red oil prices cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate freight rates to Continental ports shillings per ton of 2240 lbs., British sterling: U. S. ports cents per bbl.)

Rates Effective March 20

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K. Cont.(q)	11/	10/3-11/	11/6	10/6-11/6
Aruba-U.K. Cont.(q)	8/9	9-9/6	9/	9/-10/
Gulf-N. Atlantic (r) (not E. of N.Y.): Hvy. Crude & fuel, (10 to 19.9 gravity)	16c	16-17c	....	....
Light Crude, (30 Grav. or Lighter)	14c	14-15c	....	....
Gasoline	....	....	15c	16-17c
Kerosine	....	....	16c	17c
Light Fuel	....	....	17c	18c

(b) In barge lots. (c) Fuel oils meet specifications of U. S. Commercial Standards CS12-35. (d) In ships' bunkers. (e) For barging, add 5c per bbl. (f) For barging, add 5c to 6c per bbl. (g) For barging, add 6.5c to 7.5c per bbl. (h) 150 fire point. (i) For San Francisco cargo prices, add 5c per bbl. to cargo prices shown above. (j) Pacific Specification 200. (k) Pacific Specification 400. (l) Shipment either in bags or in bulk. (m) Less than ½ of 1% sulfur. (o) Barging 5c per bbl. additional at some ports. (p) Second-hand barrels. (q) Continental ports in range between Bordeaux and Hamburg, both inclusive. (r) Venezuela loading, same rate; Tampico, 2c to 3c per bbl. additional. (s) Low pour test, low viscosity, No. 5 generally quoted at $1.25.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I. gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency
(Effective March 6, 1939, except Corning Jan. 24, 1939)

Penna. Grade Oil in Southwest Penna. Pipe Lines.....$1.65
Penna. Grade Oil in Eureka Pipe Lines (West Virginia).....$1.59
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.).....$1.55
Corning Oil in Buckeye Pipe Lines (Ohio)..$1.02

Posted by Other Companies

Tide Water Associated Oil Co.
Bradford-Allegany district (Penna. and N. Y.) (Effective March 6, 1939).....$2.00
*The Pennzoil Co.: (Effective March 6, 1939)
Penna. Grade Oil in National Transit Lines *1.93
*The Pennzoil Co. posts $1.93 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields, prices in other lower districts range down to $1.88 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.
Midland, Midland County (Oct. 14, 1938)....$0.925

Posted by Simrall Corp.
(Effective Jan. 6, 1939)

Crystal, Greendale, Porter and equal grades..$0.925
Beaverton, Buckeye, Bentley, Edenville.....$0.90
Freeman.....$0.82
(Effective Dec. 13, 1938)
West Branch, Arenac, and equal grades....$0.70

Posted by Bay Pipe Line Corp.
(Effective Jan. 1, 1939)

Bentley and Buckeye.....$0.90
Saginaw and Wise.....$0.925

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.
(Effective Oct. 13, 1938)

Illinois and Princeton.....$1.05
Illinois Basin.....$1.15
Owensboro, (Western Ky.).....$1.10
Lima, O.....$0.90

Posted by Sohio Corp.

Illinois Basin:
Beecher City (Effective Oct. 13, 1938).....$1.15
Centralia Field:
Congested District (Effective Oct. 1, 1938) .$1.15
Area Outside Congested District (Effective Oct. 13, 1938).....$1.15

Posted by Carter Oil Co.
(Effective Oct. 14, 1938)

Louden, Fayette County, Ill.....$1.15

Posted by Ashland Oil & Transportation Co.
(Effective Oct. 14, 1938)

Somerset Oil in Ashland Lines, Kentucky:
Big Sandy River.....$1.12
Kentucky River.....$1.20

Posted by Stoll Oil Refining Co.
(Effective Nov. 10, 1938)

Stoll Pipe Line Oil (Ky.).....$1.00

Posted by Fordsville Gathering Line, Inc.
(Effective Dec. 24, 1938)

Birk City Field, Ky.....$1.05
(Effective Oct. 13, 1938)
Owensboro District, Ky.....$1.10

CANADIAN FIELDS

Posted by Imperial Oil Limited
Western Ontario
(Effective Oct. 25, 1938)

Petrolia.....$1.90
Oil Springs.....$1.97

Alberta—Turner Valley
(Prices f.o.b. field tankage)
(Effective Jan. 5, 1938)

Crude Oil			
40-40.9°	$1.14	53-53.9	$1.40
41-41.9	1.16	54-54.9	1.42
42-42.9	1.18	55-55.9	1.44
43-43.9	1.20	56-56.9	1.46
44-44.9	1.22	57-57.9	1.48
45-45.9	1.24	58-58.9	1.50
46-46.9	1.26	59-59.9	1.52
47-47.9	1.28	60-60.9	1.54
48-48.9	1.30	61-61.9	1.56
49-49.9	1.32	62-62.9	1.58
50-50.9	1.34	63-63.9	1.60
51-51.9	1.36	64-64.9	1.62
52-52.9	1.38		

Crude Naphtha, 65 grav. & above.....$2.14

Absorption Gasoline
90% Rec., 20 lb. Reid v.p.....$1.94
90% Rec., 17 lb. Reid v.p.....$2.08

MID-CONTINENT

Oklahoma-Kansas

*(Effective Oct. 11 to 22, 1938; and Feb. 16, 1939)

	S. O. Indiana	Carter Mag-nolia	Conti-nental Texas Co.	Sin-clair-Prairie
Below 21°	$0.70	$0.60	....	....
21-21.9	.72	.63	....	....
22-22.9	.74	.66	....	....
23-23.9	.76	.69	....	....
24-24.9	.78	.72	....	....
25-25.9	.80	.75	....	$0.58
26-26.9	.82	.78	....	.63
27-27.9	.84	.81	....	.68
28-28.9	.86	.84	$0.86	.73
29-29.9	.88	.87	.88	.78
30-30.9	.90	.90	.90	.82
31-31.9	.92	.92	.92	.86
32-32.9	.94	.94	.94	.90
33-33.9	.96	.96	.96	.96
34-34.9	.98	.98	.98	.98
35-35.9	1.00	1.00	1.00	1.00
36-36.9	1.02	1.02	1.02	1.02
37-37.9	1.04	1.04	1.04	1.04
38-38.9	1.06	1.06	1.06	1.06
39-39.9	1.08	1.08	1.08	1.08
40 & above	1.10	1.10	1.10	1.10

*Effective by Carter Oil, Oct. 13, posting in Okla. only; Continental Oil, Oct. 11, with lowest grade below 29; Magnolia, Oct. 12, posting in Okla. only; Shell, Oct. 22; Sinclair-Prairie, Feb. 16, 1939; S. O. Indiana, Oct. 17; The Texas Co., Oct. 12.

North-North Central and Central Texas

*Effective 1938:	Stano-lind Oct. 17	†Sinclair-Prairie Oct. 11	*Texas Co. *Conti-nental *Magnolia
Below 21°..	$0.60	....	....
21-21.9....	.62	....	....
22-22.9....	.64	....	....
23-23.9....	.66	....	....
24-24.9....	.68	$0.76	$0.79
25-25.9....	.70	for	for
26-26.9....	.72	oil	oil
27-27.9....	.74	below	below
28-28.9....	.76	29°.	29°.
29-29.9....	.78	.78	.81
30-30.9....	.80	.80	.83
31-31.9....	.82	.82	.85
32-32.9....	.84	.84	.87
33-33.9....	.86	.86	.89
34-34.9....	.88	.88	.91
35-35.9....	.90	.90	.93
36-36.9....	.92	.92	.95
37-37.9....	.94	.94	.97
38-38.9....	.96	.96	.99
39-39.9....	.98	.98	1.01
40 & above.	1.00	1.00	1.03

*Effective Oct. 11, by Continental, in North Tex.; Oct. 12, by Texas Co. in North & North Central Texas. Texas Co.'s lowest grade is 28-28.9, at $0.79; by Magnolia, Dec. 3. in N. and N. Central Texas.
†Sinclair-Prairie prices are in N. Cent. Texas and Mexia.

Jefferson County, Texas

Posted by Magnolia Petroleum Co.

Beaumont

(Effective Oct. 12, 1938)

Below 20°	$0.79	30-30.9	$1.08
20-20.9	.82	31-31.9	1.10
21-21.9	.85	32-32.9	1.12
22-22.9	.88	33-33.9	1.14
23-23.9	.91	34-34.9	1.16
24-24.9	.94	35-35.9	1.18
25-25.9	.97	36-36.9	1.20
26-26.9	1.00	37-37.9	1.22
27-27.9	1.02	38-38.9	1.24
28-28.9	1.04	39-39.9	1.26
29-29.9	1.06	40 & above	1.28

*For below 21°.
Oct. 11, '38, Stanolind Oil & Gas Co. posted same gravity and price schedule in West Beaumont field as Magnolia.

TEXAS FIELDS

Posted by Humble Oil & Refining Co.
(**West Central Texas*)
(Effective Dec. 3, 1938)

24-24.9	$0.71	33-33.9	$0.89
25-25.9	.73	34-34.9	.91
26-26.9	.75	35-35.9	.93
27-27.9	.77	36-36.9	.95
28-28.9	.79	37-37.9	.97
29-29.9	.81	38-38.9	.99
30-30.9	.83	39-39.9	1.01
31-31.9	.85	40 & above	1.03
32-32.9	.87		

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.
Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

**East Central Texas*
(Effective Oct. 11, 1938)

23-23.9	$0.78	32-32.9	$0.96
24-24.9	.80	33-33.9	.98
25-25.9	.82	34-34.9	1.00
26-26.9	.84	35-35.9	1.02
27-27.9	.86	36-36.9	1.04
28-28.9	.88	37-37.9	1.06
29-29.9	.90	38-38.9	1.08
30-30.9	.92	39-39.9	1.10
31-31.9	.94	40 and above	1.12

Posted by Pan American Pipe Line Co.
(Effective Feb. 15, 1939)

Cayuga, Anderson county.....$0.68

*Including Anderson, Cherokee, Limestone, Navarro counties.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.
(Effective Dec. 3, 1938)

	Gray County	Carson-Hutchinson
28-28.9	$0.72	$0.67
29-29.9	.74	.69
30-30.9	.76	.71
31-31.9	.78	.73
32-32.9	.80	.75
33-33.9	.82	.77
34-34.9	.84	.79
35-35.9	.86	.81
36-36.9	.88	.83
37-37.9	.90	.85
38-38.9	.92	.87
39-39.9	.94	.89
40 & above	.96	.91

Effective Oct. 11, 1938, Sinclair Prairie posted same prices in Panhandle Texas as Humble posted Dec. 3. Dec. 3, Magnolia met Humble.

EAST TEXAS

Gulf, Humble, Magnolia, Sinclair Prairie, Stanolind, Texas Co., Tide-Water Associated.....$1.10
*Effective Oct. 11 by Humble, Sinclair Prairie, and Stanolind; Oct. 12 Magnolia, Texas, Tide Water; Oct. 13 by Gulf.
Oct. 12 Magnolia, Texas, Tide Water; Oct. 13 by Gulf.
Shell also posted on Oct. 11, 1938, in Livingston area, Polk County, Texas, $1.10.

NORTHEAST TEXAS

(Posted by Humble, Oct. 11, 1938)

Talco.....$0.55

(Posted by Magnolia, Oct. 12, 1938)
Cass County and Panola County, Tex.:
Same gravity and price schedule as S. O. Louisiana posts for N. La.-Ark. Crude, which see under that company.

(Posted by The Texas Co., Oct. 12, 1938)

Cass County.....$1.05

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.
(Effective Oct. 11, 1938)
(Including Andrews, Crane, Crockett, Ector, *Gaines, Glasscock, Howard, *Reagan, Upton, Winkler and *Yoakum Counties, Texas and Lea county, New Mexico).

Below 20	$0.53	30-30.9	$0.75
20-20.9	.55	31-31.9	.77
21-21.9	.57	32-32.9	.79
22-22.9	.59	33-33.9	.81
23-23.9	.61	34-34.9	.83
24-24.9	.63	35-35.9	.85
25-25.9	.65	36-36.9	.87
26-26.9	.67	37-37.9	.89
27-27.9	.69	38-38.9	.91
28-28.9	.71	39-39.9	.93
29-29.9	.73	40 & above	.95

Pecos, West Texas.....$0.78
*Added to this posting, Aug. 29, 1938.
Oct. 12, '38, Magnolia met Humble in Crane, Glasscock, Howard, Mitchell, Upton and Winkler counties, except that its lowest grade is below 25 at $0.63.
Oct. 11, '38, Shell Petroleum met Humble in Crane, Ector, Glasscock, Howard, Upton and Winkler counties, Tex., and Lea county, N. M., except that its highest grade is 36 & above, at $0.87. It met Humble in Pecos, and in Pecos county Yates shallow pool, posted $0.65.
Oct. 11, '38, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler, except that its lowest grade is below 26 at $0.65.
Oct. 12, '38, The Texas Co. posted in Ward and Winkler counties, Tex., and Lea county, N. M., same prices as Humble in West Texas, except that its lowest grade is below 26, at $0.65, and its highest grade, 36 and above, at $0.87.
Oct. 11, Sinclair Prairie met Humble, except its lowest grade is below 25 grav., at $0.63.

Posted by Sinclair Prairie Oil Marketing Co.
(Effective Oct. 11, 1938)

Eddy county, N. Mex.....$0.77

Posted by Continental Oil Co.
(Effective Oct. 11, 1938)

Artesia, Jackson and Maljamar pools, New Mexico: gravity schedule beginning with below 29, at $0.61; 29-29.9, at $0.63; plus 2c differential for each gravity, up to 40 & above, at $0.85.

COLORADO

Posted by Continental Oil Co.
(Effective Oct. 11, 1938)

Ft. Collins and Wellington			
Below 29	$0.81	35-35.9	$0.95
29-29.9	.83	36-36.9	.97
30-30.9	.85	37-37.9	.99
31-31.9	.87	38-38.9	1.01
32-32.9	.89	39-39.9	1.03
33-33.9	.91	40 & above	1.05
34-34.9	.93		

Canon City and Florence, Col.....$0.90

SOUTH AND SOUTHWEST TEXAS

All Shown Below Posted by Humble Oil & Refining Co.
(Effective Oct. 11, 1938)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski crudes.....$0.96
Van crude.....$0.93
Conroe.....$1.27
(Effective Dec. 3, 1938)
Flour Bluff.....$1.23
Oct. 12, '38, Magnolia met Humble in Darst Creek; posted $0.87 in Luling; $0.99 in Lytton Springs; $1.14 for Cleveland, and $1.02 in Hardin, both in Liberty county, Tex.
Oct. 12, '38, The Texas Co. met Humble in Darst Creek.

**Anahuac and Dickinson*
(Effective Dec. 3, 1938)

Below 20°	$0.74	30-30.9	$1.03
20-20.9	.77	31-31.9	1.05
21-21.9	.80	32-32.9	1.07
22-22.9	.83	33-33.9	1.09
23-23.9	.86	34-34.9	1.11
24-24.9	.89	35-35.9	1.13
25-25.9	.92	36-36.9	1.15
26-26.9	.95	37-37.9	1.17
27-27.9	.97	38-38.9	1.19
28-28.9	.99	39-39.9	1.21
29-29.9	1.01	40 & above	1.23

*Includes Cedar Point, Fairbanks, Gillock, Hull, Pierce Junction and Raccoon Bend (shallow sand).

Raccoon Bend (Deep sand crude) Tomball and Satsuma
(Effective Dec. 3, 1938)

22-22.9	$0.95	32-32.9	$1.15
23-23.9	.97	33-33.9	1.17
24-24.9	.99	34-34.9	1.19
25-25.9	1.01	35-35.9	1.21
26-26.9	1.03	36-36.9	1.23
27-27.9	1.05	37-37.9	1.25
28-28.9	1.07	38-38.9	1.27
29-29.9	1.09	39-39.9	1.29
30-30.9	1.11	40 & above	1.31
31-31.9	1.13		

Dec. 3, Magnolia met above price and gravity schedule in Tomball.

(*Continued on next page*)

CRUDE OIL MARKETS *(Continued from preceding page)*

Posted by Humble

***Mirando**

(Effective Dec. 3, 1938)

Below 20°	$0.74	30-30.9	$1.03
20-20.9	.77	31-31.9	1.05
21-21.9	.80	32-32.9	1.07
22-22.9	.83	33-33.9	1.09
23-23.9	.86	34-34.9	1.11
24-24.9	.89	35-35.9	1.13
25-25.9	.92	36-36.9	1.15
26-26.9	.95	37-37.9	1.17
27-27.9	.97	38-38.9	1.19
28-28.9	.99	39-39.9	1.21
29-29.9	1.01	40 & above	1.23

*Includes Duval, Jim Hogg, Jim Wells, Webb and Zapata counties, Tex. and Heyser and Placedo crudes.

Oct. 12, '38, Texas Co. posted for Duval-Mirando, $0.77 for below 21, plus 3c differential to 26-26.9, $0.95; 27-27.9, $0.97; 28 & above, $0.99.

Dec. 3, Humble's Mirando schedule met by Magnolia.

LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

(Effective Oct. 5, 1938)

	*N. La.-Ark.	†Columbia County, Ark.	‡South Louisiana
Below 21°	$0.73	$0.66	$0.74
21-21.9	for	for	.77
22-22.9	oil	oil	.80
23-23.9	Below	Below	.83
24-24.9	25°	25°	.86
25-25.9	$0.75	$0.68	.89
26-26.9	.77	.70	.92
27-27.9	.79	.72	.94
28-28.9	.81	.74	.96
29-29.9	.83	.76	.98
30-30.9	.85	.78	1.00
31-31.9	.87	.80	1.02
32-32.9	.89	.82	1.04
33-33.9	.91	.84	1.06
34-34.9	.93	.86	1.08
35-35.9	.95	.88	1.10
36-36.9	.97	.90	1.12
37-37.9	.99	.92	1.14
38-38.9	1.01	.94	1.16
39-39.9	1.03	.96	1.18
40 & above	1.05	.98	1.20

(Effective Oct. 5, 1938)

Smackover, Ark. $0.73
Urania, La. (Ark. Fuel Oil Co., Jan. 28, '37) $1.02

*Includes Bunkie, Caddo, Carterville, DeSoto, Homer, Haynesville, Rodessa, Sabine and Sarepta, in N. La.; El Dorado and Miller County, Ark. (latter is Ark. part of Rodessa field).

Note: S. O. Louisiana prices in all La.-Ark. fields, effective Oct. 5, 1938, are on 100% tank table basis.

†Includes Buckner, Magnolia, and Village pools.

‡Includes these fields: Baton Rouge, Bayou, Choctaw, Cheneyville, Darrow, Jeanerette, Lirette, N. Crowley and Roanoke.

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

Tepetate and Ville Platte, La. $1.03

(Effective Jan. 1, 1939)

Abbeville, La.

Below 36	$0.92	38-38.9	$0.98
36-36.9	.94	39-39.9	1.00
37-37.9	.96	40 & above	1.02

Oct. 12, 1938, Magnolia Petroleum and The Texas Co. posted same gravity and price schedule as S. O. La. posts in N. La.-Ark. in these fields: Magnolia, in Bull Bayou, Cotton Valley, Haynesville, Pine Island, and Rodessa, La., and Eldorado and Rainbow, Ark.; Texas Co. in N. La. Both also met S. O. La. in Smackover. Texas Co. posted $1.24 for Garden Island, La. and $1.04 for Lafitte, La.

*GULF COASTAL FIELDS

Posted by Humble Oil & Refining Co.

†(Effective Oct. 11, 1938)

Below 20	$0.79	30-30.9	$1.08
20-20.9	.82	31-31.9	1.10
21-21.9	.85	32-32.9	1.12
22-22.9	.88	33-33.9	1.14
23-23.9	.91	34-34.9	1.16
24-24.9	.94	35-35.9	1.18
25-25.9	.97	36-36.9	1.20
26-26.9	1.00	37-37.9	1.22
27-27.9	1.02	38-38.9	1.24
28-28.9	1.04	39-39.9	1.26
29-29.9	1.06	40 & above	1.28

†Effective Dec. 3, 1938, gravities up to 45 & above discontinued in Refugio, Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor fields.

*Humble's prices apply in these Texas fields: Amelia, Clear Lake, Goose Creek, Mykawa, Sugarland, Thompsons, Webster and West Columbia; also Refugio, Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor fields.

Oct. 11, 1938, Stanolind posted in Clinton, Hastings, High Island, So. Houston, and Spindletop, same prices as Humble in Texas Gulf Coast fields, except that Stanolind's lowest grade is below 21, at $0.82.

Oct. 12, 1938, The Texas Co. posted for Texas & La. Gulf Coast crude: $0.82 for below 21 plus 3c to 26-26.9, which is $1; from there on, 2c, to 34 & above, which is $1.16. In Refugio, same as other Gulf Coast, except highest gravity is 28 & above, $1.04.

Effective Oct. 11, 1938, Sinclair Prairie met Humble's Gulf Coast price & gravity schedule.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Oct. 11, 1938)

Salt Creek, (except Tensleep crude), Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma-Kansas, ranging from $0.86 to $1.10, which see under Mid-Continent crude on previous page.

Tensleep, Salt Creek field	$0.646
Iles, light, Col	0.98
Iles, heavy	0.92
Elk Basin, light	0.90
Grass Creek, light	0.90
Frannie light	0.55
Grass Creek, heavy	0.40
Hamilton Dome, Wyo	0.35
Frannie heavy	0.42

Posted by Ohio Oil Co.

(Effective Oct. 11, 1938)

Elk Basin, Wyo	$0.90
Grass Creek, light	0.90
Rock Creek	1.00
Lance Creek	0.77
Dry Creek, Mont	0.92

(Effective May 1, 1938)

Grass Creek, heavy $0.50

(Effective Nov. 16, 1937)

Sunburst, Mont $0.90

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

Cat Creek, Mont	$1.10
Big Muddy, Wyo	0.98
Lance Creek, Wyo	0.77

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1937; Greeley-Canal, July 9, 1938; Santa Maria Valley, by Union Oil, Oct. 15, 1938.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athens Rosecrans	Domingues	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria (Union Oil)
13-13.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.63
14-14.9	$0.80	$0.79	$0.74	$0.78	$0.79	$0.80	$0.76	....	....	$0.80	$0.76	$0.76	$0.77	$0.78	....	$0.70	....	$0.70	$0.70	....	$0.70	$0.70	....	.65
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.68
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.70
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	....
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	....	.74	.71	.70	....
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	....	.78	.72	.70	....
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	....	.82	.74	.70	....
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	....	.86	.78	.72	....
23-23.9	.95	.85	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	....	.90	.82	.76	....
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	....	.94	.86	.79	....
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	....	.98	.90	.83	....
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	....	1.02	....	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.91	1.06	....	....	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.94	1.10	....	....	....
29-29.9	1.17	1.15	.93	1.18	1.18	Pipe	1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.98	1.14	....	....	....
30-30.9	1.21	1.19	.95	1.22	1.21	....	1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	1.02	1.18	....	....	....
31-31.9					1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	1.06				....
32-32.9		*Ellwood Terrace			1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.09	Kettleman Hills			....
33-33.9	....	1.28	....	....	....	Standard	....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.13	....	1.19	....	....
34-34.9	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.17	....	1.23	....	....
35-35.9	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.20	....	1.27	....	....
36-36.9	....	1.39	....	....	....	F.O.B.	....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.24	....	1.31	....	....
37-37.9	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.28	....	1.35	....	....
38-38.9	....	....	....	....	....	Line	....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.31	....	1.39	....	....
39-39.9	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.35	....	1.43	....	....
40-40.9	....	....	....	....	....		....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.39	....	....	....	....
41-41.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.43	....	....	....	....
42-42.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.46	....	....	....	....
43-43.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.50	....	....	....	....
44-44.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.54	....	....	....	....
45-45.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.57	....	....	....	....
46-46.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.61	....	....	....	....
47-47.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.65	....	....	....	....
48-48.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.68	....	....	....	....

*F. o. b. ship.

‡Also McKittrick, Kern River. Kern Front and Round Mountain $0.70 thru 19.9 gravity; no higher gravity quoted.

†Wilmington prices differ on gravities below 18.9. Prices are: 14-16.9, $0.75; 17-17.9, $0.77; and 18-18.9, $0.79; rest of schedule same as Signal Hill.

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OPPORTUNITY REPRESENTING REFINER of motor oils and greases; established in 1869; in Chicago and Kansas City territories. Selling wholesalers and dealers. Existing business to build on. Salary: $175 plus liberal commission and all traveling expenses paid. Give your life-history and photograph in first letter. Address Box 100.

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ATTENTION: REFINERS interested in developing outlets for petroleum products in Buffalo, Niagara Falls, Lockport and the Tonawandas. We have an interesting proposition to offer refiners who can ship into this area, either by water or rail.

Address Box 99,
NATIONAL PETROLEUM NEWS

For Sale

One Twelve-Thousand and One Eight-Thousand Gallon horizontal tank, Three Twelve-Hundred Gallon upright tanks, One 1½-ton Dodge Truck with 411 Gallon tank body. Lenard Greer, Warrensburg, Missouri.

Wanted to Buy

GREASE AND OIL FILM Testing machines. Give full description of machine bearing parts and availability. 110 A. C. Sixty Cycle motor driven. And cash price. Address Box 101.

Professional Services

PHOENIX
CHEMICAL LABORATORY
An Exclusive Petroleum Testing Laboratory
Equipped For All Known Tests & Research in Petroleum Products
3953 Shakespeare Ave., Chicago
Telephone—Spalding 3578

GEORGE A. BURRELL
Petroleum and Gas Engineer
Design Construction Reports

Suite 2900,
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1936-42 Fifth Ave.
Pittsburgh, Pa.

ANTI-KNOCK VALUES
DETERMINATIONS
The Gray Industrial Laboratories
Chemists and Engineers
Specialists on Petroleum Products
961-976 Frelinghuysen Ave.
NEWARK, N. J.
Telephone Bigelow 3-4020

Miscellaneous

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"For Sale," "Wanted to Buy," "Help Wanted," "Business Opportunities," "Miscellaneous" classifications, set in type this size without border — 10 cents a word. Minimum charge, $3.00.

"Position Wanted"—5 cents a word. Minimum charge $1.00.

Advertisements set in special type or with border—$4.00 per column inch.

Copy must reach us not later than Saturday preceding date of issue.

All advertisements carried on this page are payable in advance.

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FUEL OIL

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spotty as buyers continued purchasing on a hand-to-mouth basis.

Michigan

ALMA, March 20.—A refiner reported advancing his quotation for 67-69 octane gasoline 0.25 cent to 6.5 cents the past week. Two refiners said they had advanced their quotations for straight run gasoline 0.25 cent to 4.25 cents; other quotations reported for this product ranged from 4 to 4.5 cents. Another refiner said he had temporarily withdrawn his quotation on straight run gasoline due to insufficient supplies.

A refiner reported reducing his quotation for 47-49 w.w. kerosine 0.2 to 5 cents; other prices for this product ranged up to 5.2 cents, according to reports.

TRADEMARKS

The following are trademark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Munsey Building, Washington, D. C., trademark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

FLASHMASTER. Ser. No. 411,969. Henry T. Schiff, Chicago. Filed Oct. 22, 1938.
For flashlights and lanterns using oil for fuel.

FRAM FULFLEX. Ser. No. 413,068. Fleming Manufacturing Company, East Providence, R. I. Filed Nov. 23, 1938.
For tubes for oil filter connections.

COPAR. Ser. No. 412,132. General Chemical Company, New York. Filed Oct. 28, 1938.
For insecticides and fungicides.

BLACK BEAR, and representation of a bear. Ser. No. 406,576. The Black Bear Company, Inc., Long Island City, N. Y. Filed May 21, 1938.
For lubricating, cutting, burning, and processing oils; lubricating greases, fats, and waxes; rubber and metal lubricants having oil and water bases.

PANCLIMATIC. Ser. No. 411,896. Panther Oil & Grease Mfg. Co., Fort Worth, Tex. Filed Oct. 21, 1938.
For lubricating oils and greases.

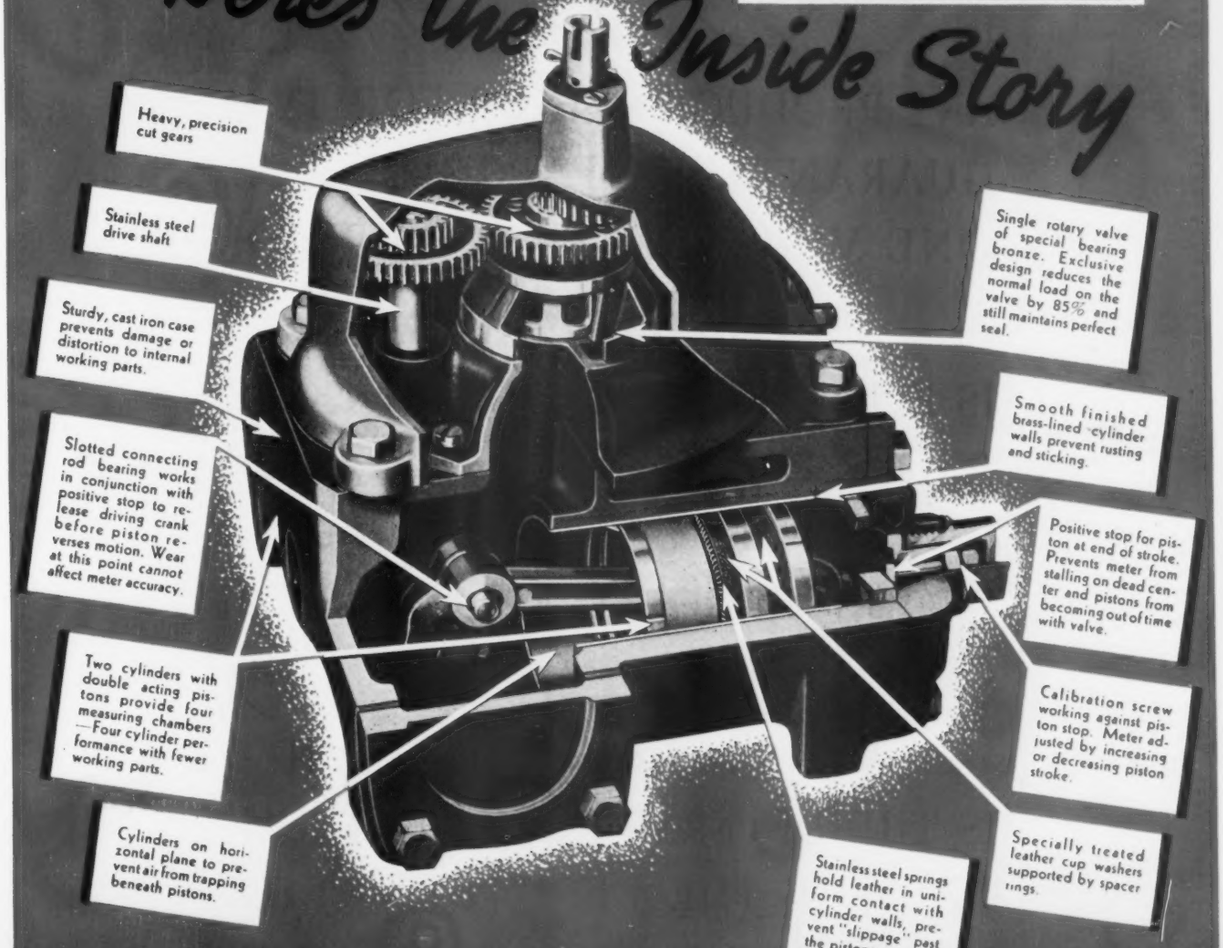
PERKO. Ser. No. 407,325. Perkins Marine Lamp & Hardware Corporation, New York and Brooklyn, N. Y. Filed June 10, 1938.
For pumps, foghorns, air whistles, automatic drainers in the nature of pumps, oil cups, and grease guns.

BKC on shield-like figure, and globe with words "World Wide Distribution." Ser. No. 411,181. Reichhold Chemicals, Inc., Detroit and Ferndale Station, Detroit, Mich. Filed Oct. 1, 1938.
For resins, including synthetic resins and processed natural resins, resin solutions, including plastic resin solutions, and oils, including processed oils and synthetic oils, all of such products being for use in paints, lacquers, varnishes, enamels and the like.

PITTSBURGH SERVICE STATION PUMP METER

TROUBLE FREE
•
ACCURATE
•
OVER 100,000 IN USE

Here's the Inside Story


Heavy, precision cut gears
Stainless steel drive shaft
Sturdy, cast iron case prevents damage or distortion to internal working parts.
Slotted connecting rod bearing works in conjunction with positive stop to release driving crank before piston reverses motion. Wear at this point cannot affect meter accuracy.
Two cylinders with double acting pistons provide four measuring chambers —Four cylinder performance with fewer working parts.
Cylinders on horizontal plane to prevent air from trapping beneath pistons.
Single rotary valve of special bearing bronze. Exclusive design reduces the normal load on the valve by 85% and still maintains perfect seal.
Smooth finished brass-lined cylinder walls prevent rusting and sticking.
Positive stop for piston at end of stroke. Prevents meter from stalling on dead center and pistons from becoming out of time with valve.
Calibration screw working against piston stop. Meter adjusted by increasing or decreasing piston stroke.
Specially treated leather cup washers supported by spacer rings.
Stainless steel springs hold leather in uniform contact with cylinder walls, prevent "slippage" past the pistons.

PITTSBURGH EQUITABLE METER COMPANY
MERCO NORDSTROM VALVE CO.
NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES · *Main Offices* · PITTSBURGH, PA. · DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

Make sure the pumps you buy are equipped with PITTSBURGH METERS

A PRODUCT OF THE WORLD'S LARGEST MANUFACTURER OF GASOLINE, OIL AND GREASE METERS

GULF

This emblem ON ANY PRODUCT STANDS FOR TWO GUARANTEES OF EXCELLENCE, ONE VISIBLE, ONE INVISIBLE.

The visible GUARANTEE IS EVIDENCED BY THE PLANT AND PROPERTIES THAT MAKE GULF ONE OF THE COUNTRY'S LARGEST PRODUCERS AND REFINERS OF CRUDE OIL.

The invisible GUARANTEE IS THE DETERMINATION OF GULF TO MAKE THE BEST PETROLEUM PRODUCTS THAT SKILL, SCIENCE, LOYAL EMPLOYEES AND ALERT MANAGEMENT CAN JOINTLY ACHIEVE.

NATIONAL PETROLEUM NEWS—March 29, 1939—Vol. XXXI—No. 13
Published every week at 1213 West 3rd St., Cleveland, O. Subscription rate $3.00 per year in United States and Mexico; $4.00 Canada; $4.50 foreign countries. Entered as second class matter Jan. 17, 1910 at Cleveland, O., post office under act of Mar. 3, 1879, by The National Petroleum Publishing Co.

INTERNATIONAL HARVESTER

sells MORE HEAVY-DUTY TRUCKS (2-ton and up) *than any other* THREE MANUFACTURERS COMBINED

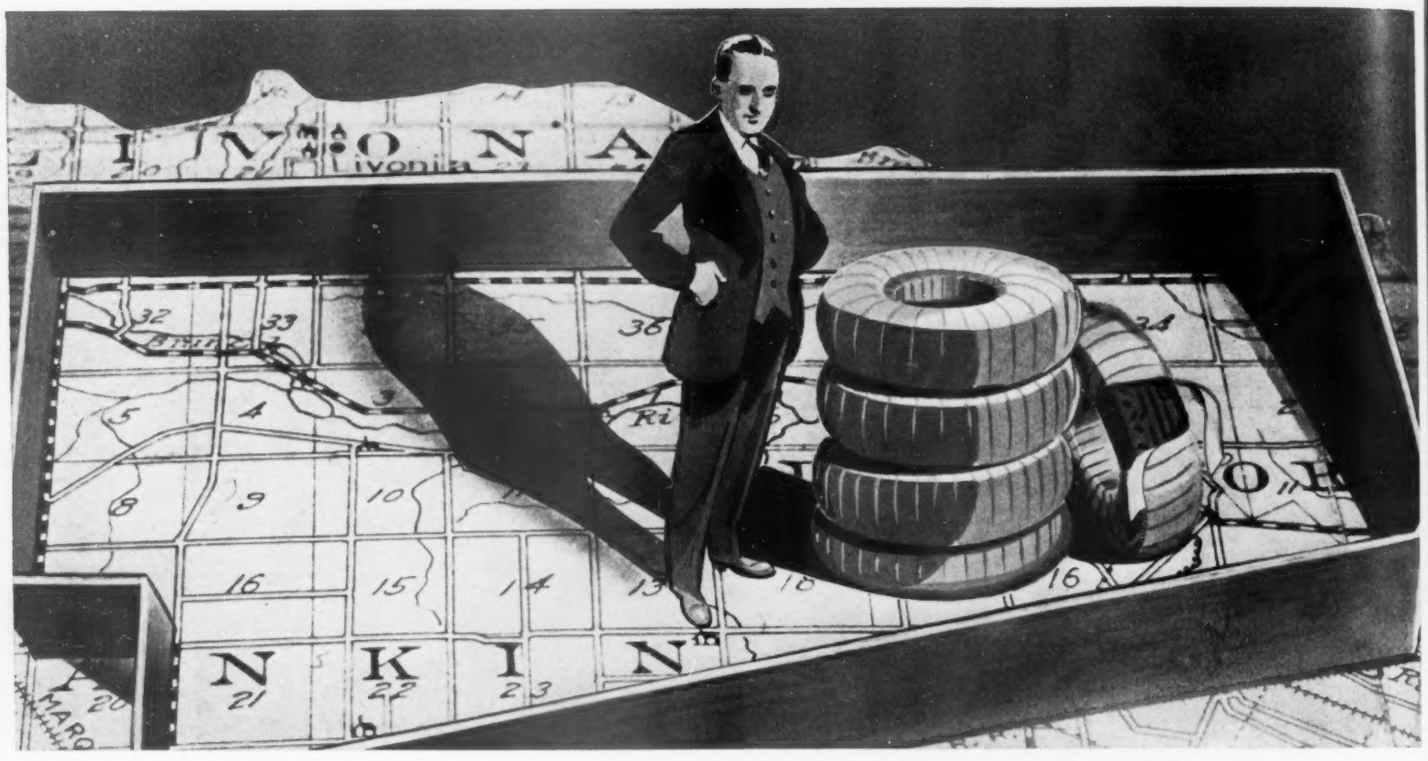
IN ever-increasing numbers, truck users are investing in the truck that bears the Triple-Diamond mark. They are *cashing in* on the *high-quality standard* maintained for International Trucks during thirty-two years of truck manufacture . . . a quality standard of which every man in the Harvester organization is proud.

Another practical reason for the great demand for International Trucks is the fact that they are backed by the *most complete Company-owned truck service organization.* Whatever your own hauling need, the International dealer or branch near you has the truck for it. Sizes range from ½-ton light-delivery trucks to big 6-wheelers.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL TRUCKS

You can build



Progressive Oil Jobbers are making profits on tires. Every service station customer you have must buy tires from somebody. Since you as an oil man have the most frequent and regular contacts with him, there's no reason why he shouldn't buy his tires from you.

But *Protected Territory* is as important in tires as in oil and gas. You don't want your next door neighbor to sell your brand of tires any more than you want him to sell your brand of oil. So Miller provides real territory protection — to safeguard for *you* the business *you* build.

If you are not getting a generous share of this profitable volume, get the details of the Miller 2-Way Franchise now. Check its money-making features on the next page.

• MILLER

1939 IS MILLER'S

a fence around your MILLER territory

TO KEEP YOUR CUSTOMERS IN AND YOUR COMPETITORS OUT

Miller provides you with the two most essential things for building and holding a profitable tire business.

First, an up-to-date, top quality tire in every price range — a complete line, with every tire carrying an attractive selling price and a liberal margin of profit.

Second, Protected Territory. The business you build is *yours*, without competition on your brand in your trading area. You create customers instead of merely making sales.

That is why so many successful distributors have been selling Millers for ten, fifteen, twenty years — showing a growth in sales and profits year after year.

COMPARE THIS MILLER 2 WAY FRANCHISE WITH ANY OTHER PROPOSITION

Here are Miller's "large company" features — Consistent High Quality year after year, Financial Responsibility, Consumer Acceptance, Research and Development Facilities, and ample Advertising Assistance.

Then add these recognized "small company" features—Protected Territory, Higher Margin of Profit, Individual Assistance on local problems, and Adaptability of program.

It's the winning combination — the kind of proposition *you would write for yourself*, a 2-Way Franchise.

WRITE OR WIRE TODAY for complete details. Address Miller Tire Division, 500 S. Main St., Akron, Ohio, or 5400 E. 9th St., Los Angeles, Calif.

GEARED-TO-THE-ROAD **TIRES**

47th YEAR IN RUBBER

CONFERENCE
TELEPHONE SERVICE
brings busy men together
any time—anywhere—inexpensively
This modern service makes it possible for men miles apart to talk things over as if they were face to face. Every one can hear and be heard. Direct, personal discussion prevents delays and misunderstandings. Questions are cleared up and decisions made quickly.
The scattered executive committee of a wool marketing association meets by telephone at 10% of the cost of a customary conference. . . .
The sales manager of a can company used a three-way hook-up with two customers —got permission to divert a shipment of cans from one to the other —and saved a bumper crop of tomatoes. . . . A brick company quotes prices and discusses terms with all of its dealers in the same territory at the same time by conference connection.
There are many other uses for Conference Service. The savings in time and money are obvious. Up to six telephones—more, by special arrangement—can be connected. Just ask Long Distance for the Conference operator.
BELL SYSTEM

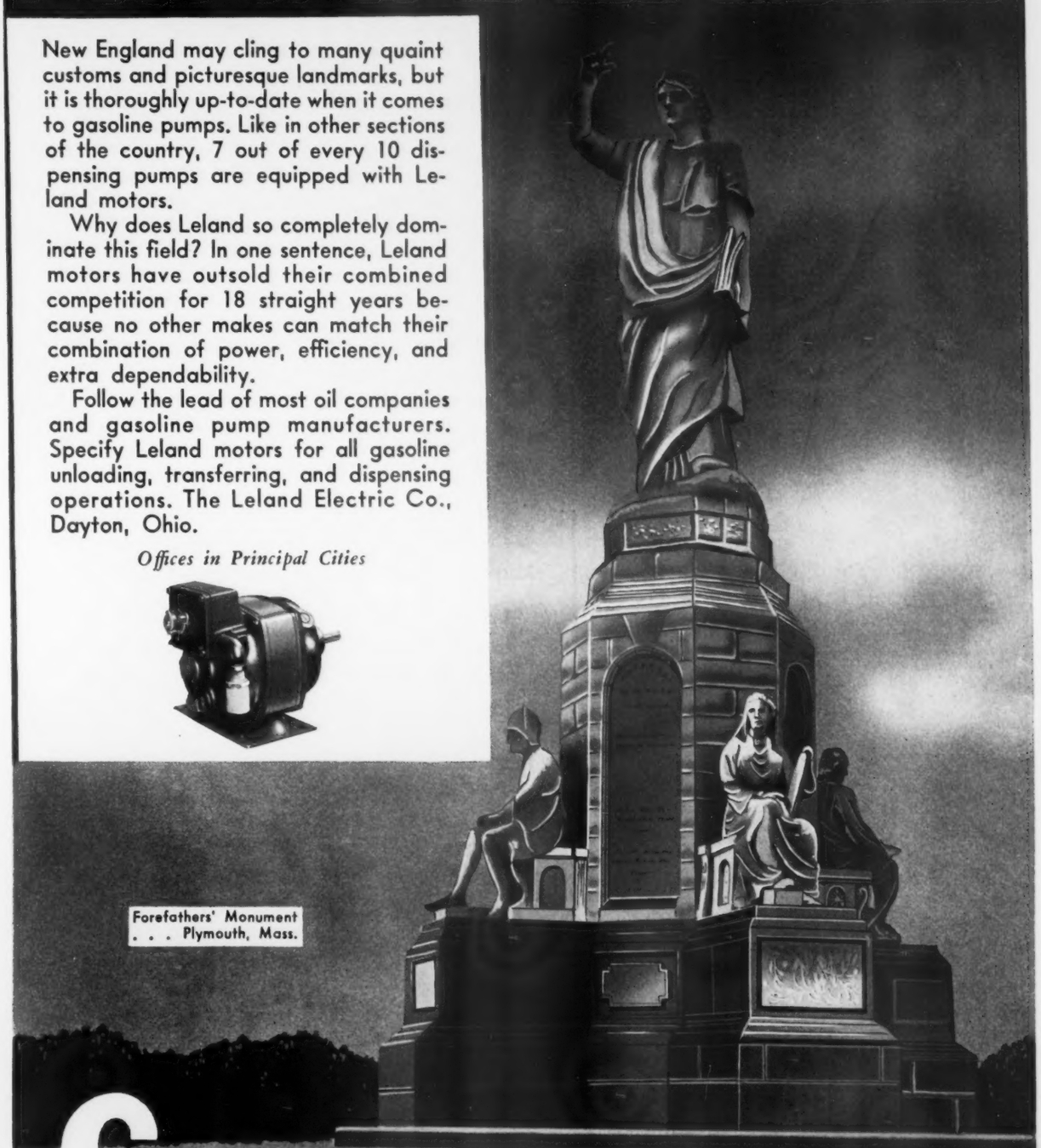
7 OUT OF 10 IN NEW ENGLAND

New England may cling to many quaint customs and picturesque landmarks, but it is thoroughly up-to-date when it comes to gasoline pumps. Like in other sections of the country, 7 out of every 10 dispensing pumps are equipped with Leland motors.

Why does Leland so completely dominate this field? In one sentence, Leland motors have outsold their combined competition for 18 straight years because no other makes can match their combination of power, efficiency, and extra dependability.

Follow the lead of most oil companies and gasoline pump manufacturers. Specify Leland motors for all gasoline unloading, transferring, and dispensing operations. The Leland Electric Co., Dayton, Ohio.

Offices in Principal Cities



Forefathers' Monument . . . Plymouth, Mass.

LELAND

LEADER FOR EIGHTEEN STRAIGHT YEARS

FROM EVERY ANGLE . . . . EXIDE HAS WHAT IT TAKES

"What we like better than a good guarantee is a good battery, one that has no trouble—and that is what Exide has been. After more than 20 years in the battery business, I am still sure that Exide is the tops."

—Mr. Fred L. Troxell, Brown Battery & Elec. Co., Denver, Colo.

"I have sold more than four times as many batteries since taking on Exide as I sold of any other make in my 21 years of experience. Your splendid equipment has been invaluable in taking the guesswork out of testing. We can now tell when a customer needs a new battery, and the equipment convinces him that we are not trying to hang something on him."

—Mr. Elwood E. Kieser, Ellwood E. Kieser Center-O-Service, Phila., Pa.

"Did you ever come out of a grease pit and try to find a battery price and specifications from a catalogue? You Exide people must have—for you've placed all the dope right there on the Exide Vendor, and it does sell batteries. It has increased our sale of the higher-capacity, more profitable batteries, increasing the profits in our battery department by 34%."

—Mr. "Babe" Hollingbery, "Babe" Hollingbery's Super Service Station, San Francisco, Calif.

"Operating a super-service station is no cinch. Exide has helped in an important part of our business—batteries. Our Exide Sure-Start Tester has helped us sell many batteries. Otherwise, it would have been difficult to convince many a car-owner that his battery was actually worn out, while it still cranked his car."

—Mr. A. W. Fink, Shaker Heights Mobile Service, Shaker Heights, Ohio (Cleveland Suburb).

"We had an idea there was nothing but grief in the battery business, but since taking on Exide we are convinced that complete battery service nets us more than any other line of service or merchandise we could offer. This has been made possible by Vendor Selling and the constant use of the Exide Sure-Start Tester."

—Mr. R. A. Loy, Loy & Smith's Service Station, Cincinnati, Ohio.

THE Exide Proposition is far more than a line of good batteries—it is a complete, sure-fire program for making the battery business produce bigger profits for the dealer. And it works like a well-oiled machine.

First, you get a line of Exides, priced for every car-owner, backed by consistent advertising, and known everywhere for their quality and value.

You have the Exide Automatic Vendors that compare batteries on the basis of their cranking ability, life and price—selling the higher-profit Exide types, *automatically.*

You have the special Exide instruments that take the guesswork out of battery servicing and selling, plus the Sure-Start merchandising program that holds your present customers and brings in many new ones. You also have the Exide service tools that cut the time and trouble of every battery job.

How does it work in practice? On this page you can read the comments of typical Exide Dealers. See your Exide Wholesaler today, or get in touch with us.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

1 *Aqua Compact.* Exclusive Aqua feature—combines in a single housing all essential parts of the pump and Red Seal Positive Displacement Meter assembly.

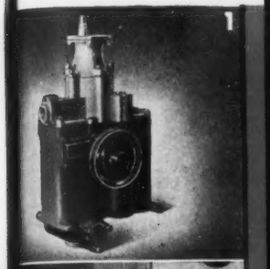
2 *One Knob Price-Setter.* Price can be changed with one hand.

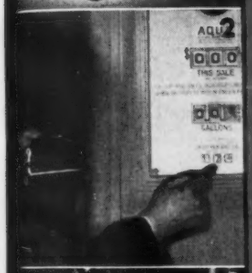
3 *Theft Sealed Meter Coupling.* Sealed to discourage tampering. Easily removed without disturbing meter or register.

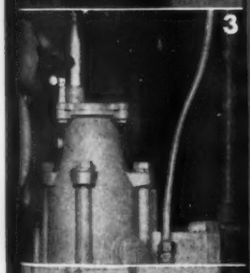
4 *Aqua Packless Pump.* No packing, no mechanical seal. Leakproof. Outboard bearing. Silent gear operation.

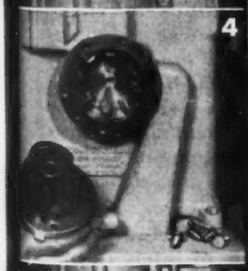
5 *Aqua Pump Pressure Control Unit.* Located *outside* Aqua Compact, may be quickly removed for easy cleaning.

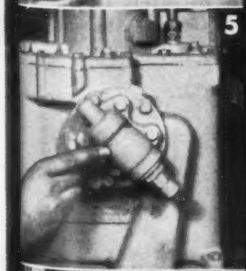
6 *Bonderizing Treatment.* Where Aqua superfinish starts. Prepares panel surface for baked enamel coats.











AQUA

The Modern COMPUTING-METER PUMP AT ITS BEST!

HERE, rising pump service costs are stopped! Aqua's engineering skill produces a computing-meter pump as reliable, as fool-proof, as *perfected* as your modern automobile—with the same sturdy construction to withstand constant service over many years without costly upkeep. This new Aqua *Computing-Meter* Pump gives you genuine trouble-free service...and, at all times, accurate dispensing conforming to the Sealers' most exacting requirements. Write for Bulletin 39-AN today. It gives full details.

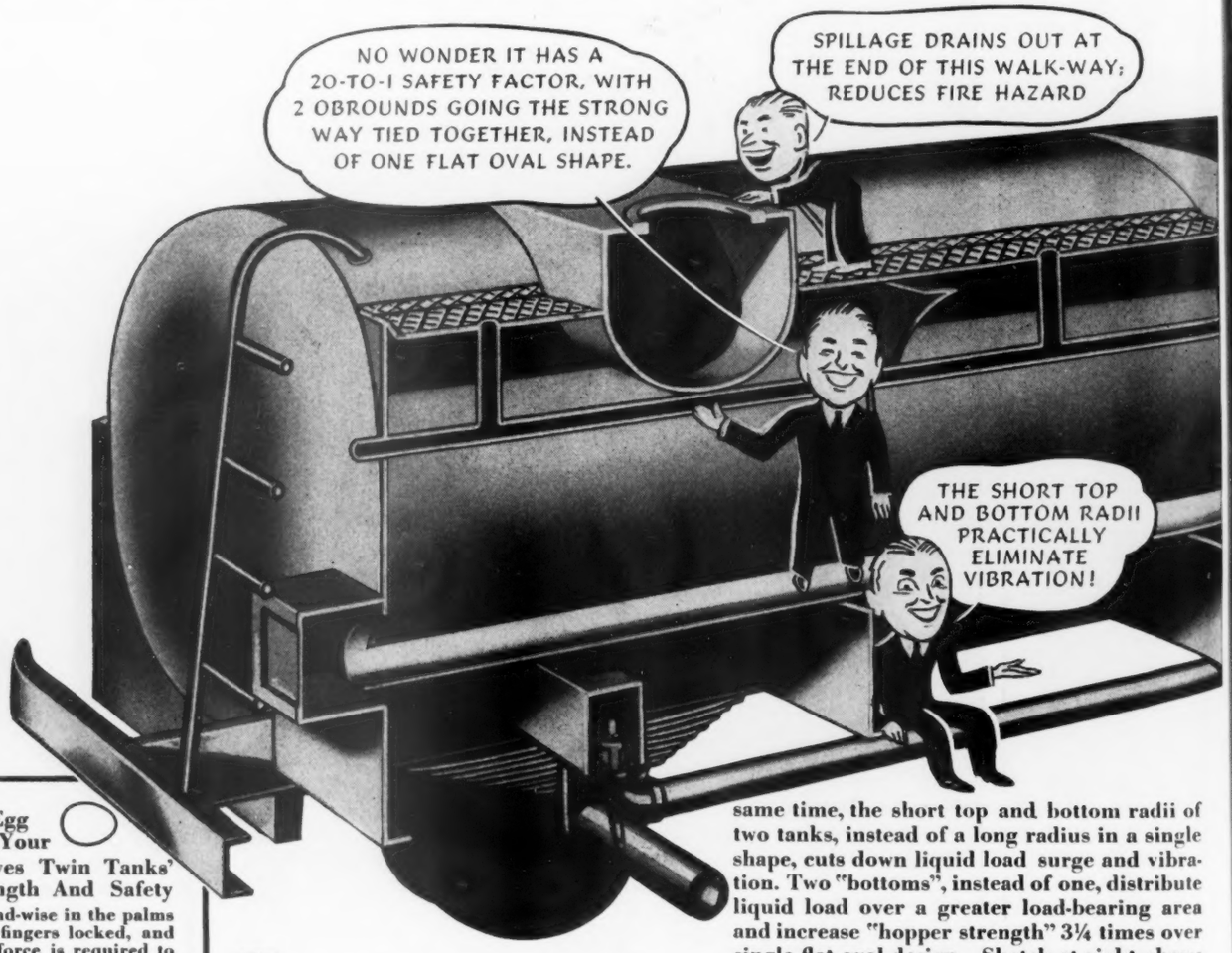
AQUA SYSTEMS, INCORPORATED SUBSIDIARY NEPTUNE METER COMPANY **2443 THIRD AVENUE, NEW YORK, N.Y.**

ATLANTA, GA. KANSAS CITY, MO. LOUISVILLE, KY. CHICAGO, ILL. LOS ANGELES, CAL. DALLAS, TEX. TORONTO, 3, ONTARIO

Other branches throughout the entire U.S.A.

"INSIDE FACTS" ON AMAZING

Worth Money To Study This Sketch And See How
SAFETY FACTOR, *boosted* CRITICAL BOTTOM STRENGTH


NO WONDER IT HAS A 20-TO-1 SAFETY FACTOR, WITH 2 OBROUNDS GOING THE STRONG WAY TIED TOGETHER, INSTEAD OF ONE FLAT OVAL SHAPE.
SPILLAGE DRAINS OUT AT THE END OF THIS WALK-WAY; REDUCES FIRE HAZARD
THE SHORT TOP AND BOTTOM RADII PRACTICALLY ELIMINATE VIBRATION!

An Egg From Your Kitchen Proves Twin Tanks' Greater Strength And Safety

Place the egg end-wise in the palms of your hands, fingers locked, and see how much force is required to crush it... a great deal more than is needed to crush the egg laid long-wise. The extra strength in the end-wise position is due to the fact that curvature at the ends is formed on a shorter radius than at the sides.

Here is a basic step forward in design that increases safety at five points—while actually stepping up capacity! Actually, Twin-Tanks' two shapes increase beam strength until it is 20 times as great as needed to carry the combined weight of tank and full load. At the same time, the short top and bottom radii of two tanks, instead of a long radius in a single shape, cuts down liquid load surge and vibration. Two "bottoms", instead of one, distribute liquid load over a greater load-bearing area and increase "hopper strength" 3¼ times over single flat oval design. Sketch at right shows how they multiply critical bottom strength by eight. Not only that, Twin-Tank depressed walk-way cuts down fire hazard.

Before you buy any tank, find out about Twin-Tanks—five new kinds of safety in one design are bound to be worth money to you.

The Petroleum Transit Corp., Detroit, Michigan, and subsidiary companies hauling in ten states, now operate a fleet of 70 BUTLER TRANSPORTS, the last 10 of which are BUTLER Twin-Tank Safety Transports. Shown here are a few of their first Butler Trailow-Tanks which have covered hundreds of thousands of miles.

Write **BUTLER MANUFACTURING**

NEW *Twin-Tank* TRANSPORT!

Butler Has Engineered 20-To-1 BEAM STRENGTH 8-TO-1, GIVEN 3¼-TO-1 HOPPER STRENGTH INCREASE

THIS DIAMOND-TREAD WALK-WAY GIVES SAFER FOOTING
BUTLER TWIN-TANK Safety TRANSPORT
THIS DESIGN GIVES ½-GALLON MORE LOAD CAPACITY PER INCH OF LENGTH COMPARED TO OVAL OF SAME HEIGHT AND WIDTH!
YES—AND IT GIVES DOUBLE THE VERTICAL SHEAR STRENGTH.

Why *Twin-Tanks* Have 8 Times Greater Critical Bottom Strength

Arrows show the direction of load stress. Extra strength is vital here, at the most common section of failure in conventional construction.

AGAIN BUTLER HELPS YOU MEET TIGHTENING REGULATIONS WITHOUT INCREASED DEADLOAD

For years, hundreds of haulers coast to coast have been cutting transport costs with Butler Trailow-Tanks. Low center of gravity, greater safety and increased carrying capacity is good news to any liquid hauler. Now, in Twin-Tanks, haulers find an advance that equals the Trailow-Tank principle in importance. Twin-Tanks' extra beam strength, extra hopper strength, extra critical bottom strength afford an additional margin of safety *to your rolling-stock investment* and safeguard it against premature obsolescence due to legal restrictions.

Write Today!

Find out how Twin-Tanks can give you the extra margin of safety—in transports that permit you maximum profitable payload.

COMPANY— KANSAS CITY, MO. MINNEAPOLIS, MINN.

BUTLER MANUFACTURING COMPANY
1241 Eastern Ave. Kansas City, Mo.
941 Sixth Ave., S. E. Minneapolis, Minn.

We are interested in weight-saving, more payload and the Greater Safety of:

☐ BUTLER TWIN-TANK SAFETY TRANSPORT of _____ Gallons Capacity.

Firm Name _____

Address _____

City _____ *State* _____

In Champlin Oils and Lubricants....

Quality is not an over-worked noun with us. It's a definite part of the Complete line of Champlin Lubricants. Quality comes first in the selection of a high grade paraffin base Crude and in the refinement processes the greatest care is used in removing undesirable elements naturally found in the raw Crude. Champlin Oils are thoroughly dewaxed—mechanically — no acids or impurities are added to weaken the rich oily base.

Independent Jobbers are high in their praise of Champlin Oils.

Order a complete stock of Summer grades now.

Gasoline Pipeline Terminals and complete stocks of Lubricants at Hutchinson, Kansas and Superior, Nebraska . . . Warehouses at Lincoln, Omaha, Grand Island and Superior, Nebraska, Mason City, Iowa, Denver, Colorado, and Springfield, Missouri.

CHAMPLIN REFINING COMPANY

GENERAL OFFICES — ENID, OKLAHOMA

Choose Champion Spark Plugs
the Preferred Stock *Investment*

FOR GREATEST RETURN WITH GREATEST SECURITY

IF THERE IS one thing more important than all others in choosing the items which make up your "stock in trade," it is the selection of lines which constitute the soundest possible investment.

Champion Spark Plugs qualify by every security standard as the *preferred stock* investment. They give you unequaled turnover because they are the preferred spark plugs. They give you steady income because they are the preferred spark plugs. They give you sound security, having absolute cash value, because they are the preferred spark plugs.

Champion's new Sillment seal—which permanently seals them against troublesome leakage common to ordinary spark plugs—brings another outstanding value to the many exclusive and patented features which have made Champions the preferred spark plugs—a demonstrable, merchandisable feature that is *creating* sales for Champion dealers everywhere.

Get on a sound basis by choosing Champions, the *preferred stock* investment, with greatest return and greatest security.

IT'S THRIFTY TO STOCK AND SELL CHAMPIONS

What to say
when customers say:

"I CAN'T SEE ANY DIFFERENCE!"

YOU want Mr. Jones to buy a good grade of gasoline from you. But suppose Mr. Jones suddenly gets the idea he can "economize"... starts buying low-grade gasoline and tells you that he "can't see any difference in performance!"

What's the answer? Just this: Mr. Jones' car needs *tuning-up*... and by that we mean it should be tuned-*up* by a competent tune-up man to take advantage of the better grades of gasoline you want him to use. Very often cars are tuned-*down*—by retarding the spark—to permit the use of low-grade gasoline without "knock" or "ping."

Remember, modern high compression cars are built to deliver top power and economy only when the spark is *advanced* to the point of "maximum performance." A *retarded* spark means *loss* of power and economy.

Because there are different grades of gasoline sold today, every car has different grades of performance, depending on the gas used and the spark setting.

YOUR CUSTOMERS HAVE THESE 3 CHOICES

BEST PERFORMANCE—with gasoline marked "Ethyl" on the pump or globe. It is highest in anti-knock and all-round quality. Contains enough tetraethyl lead so that the engine's spark can be *advanced* closest to the point of maximum power and economy without "knock" or "ping."

GOOD PERFORMANCE—with "regular" gasoline which permits the spark to be considerably advanced without "knock" or "ping." Most "regular" gasolines now contain tetraethyl lead, as shown by the "Lead" signs on the pumps.

POOR PERFORMANCE—with low-grade gasoline, poor in anti-knock quality. With low-grade gasoline in a modern car, the engine's spark must be *retarded*—which means *loss* of power and economy.

TUNE IN ON "TUNE-UP TIME" *Radio's new hit show, on a coast-to-coast hook-up...designed to give the public the facts about fuels and engines...Thursdays ...Columbia Broadcasting System, 10 p. m., E. S. T.*

ETHYL GASOLINE CORPORATION, *sole manufacturer of anti-knock fluids containing tetraethyl lead*

"LOOK, BOSS... HERE'S WHY NEOPRENE HOSE LASTS LONGER...

Ask your supplier for

NEOPRENE

gas pump hose

...OR WRITE US FOR A LIST OF MANUFACTURERS

See our Exhibit, Oil World Exposition Houston, Texas . . . April 24 to 29

. . . It's lighter, more flexible . . . won't crush or scuff!"

NOW you can get a longer-lasting gas pump hose. Neoprene smooth-bore hose. A neoprene hose has no metal lining to kink, crystallize or break. And its smooth neoprene lining isn't affected by gasoline, so it doesn't deteriorate even after long service.

Gas flows faster through smooth-bore hose, too. Which means quicker service, happier customers. And neoprene hose stays good-looking throughout its long life.

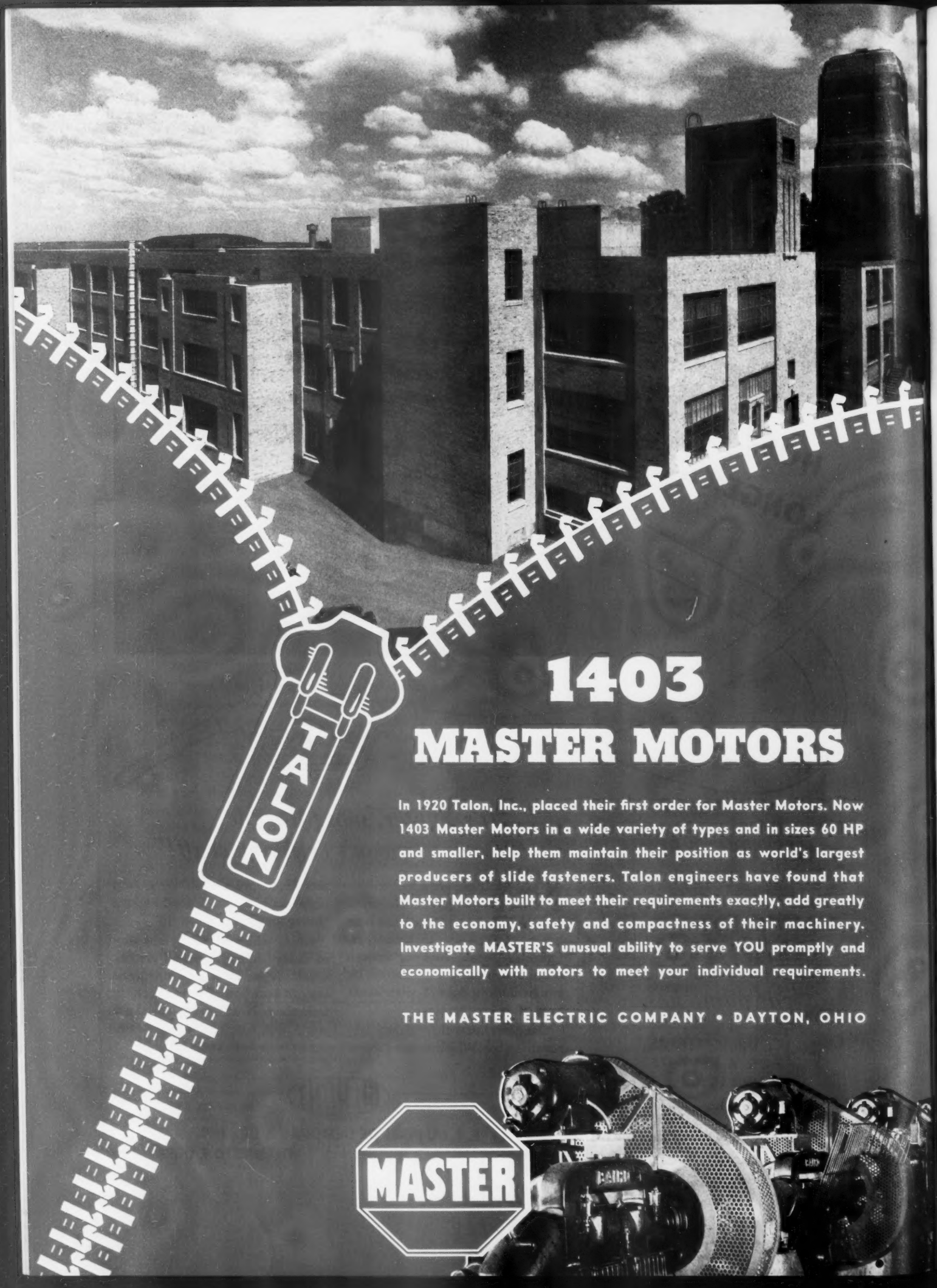
All of which helps explain why so many leading gasoline distributors are switching to neoprene smooth-bore hose. Better take a tip from them. Next time you need gas pump hose, specify this longer-lasting smooth-bore neoprene.

DU PONT

REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO., INC.

RUBBER CHEMICALS DIVISION WILMINGTON, DELAWARE



1403
MASTER MOTORS

In 1920 Talon, Inc., placed their first order for Master Motors. Now 1403 Master Motors in a wide variety of types and in sizes 60 HP and smaller, help them maintain their position as world's largest producers of slide fasteners. Talon engineers have found that Master Motors built to meet their requirements exactly, add greatly to the economy, safety and compactness of their machinery. Investigate MASTER'S unusual ability to serve YOU promptly and economically with motors to meet your individual requirements.

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

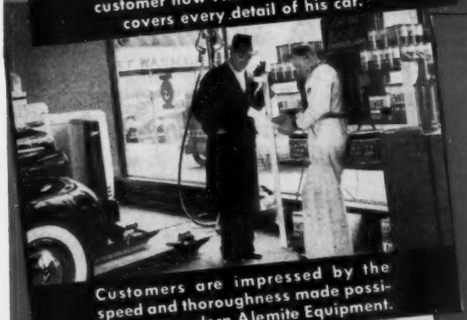
MASTER

..Leads the Field

IN EQUIPMENT, LUBRICANTS, SERVICE AND CO-OPERATION!

ONLY 66¢* PER DAY PAYABLE MONTHLY

Operator Wallace Ryan shows a customer how Alemite Lubrication covers every detail of his car.



Customers are impressed by the speed and thoroughness made possible with modern Alemite Equipment.

Lubrication customers often buy all their service where they buy lubrication service. Alemite builds sales.

ILLINOIS DEALER BUYS NEW ALEMITER AS RESULT OF 13 YEARS' EXPERIENCE WITH ALEMITE EQUIPMENT AND LUBRICANTS

HERE'S J. C. (Doc) Clayton, himself, in his garage at 5438 W. Cermak Road, Cicero, Illinois. Asked how he happened to choose the beautiful new 1939 Alemiter 193 from all the field of lubrication equipment, he said, *"The reason I have made this investment is because I believe Alemite leads the field in equipment and lubricants*—also in their marvelous service and co-operation!" And "Doc" has been using Alemite Equipment and Alemite Lubricants for 13 years!

This attitude is typical of Alemite dealers. Investigate the new 1939 line of Alemite Equipment! *Its efficient performance permits a better lubrication job with lower air consumption.* Whole interior instantly accessible for adjustment. Complete range of portable and stationary models. Builds sales for every department of your business, by bringing new lubrication customers. Phone, wire, or write for details!

ALEMITE

REG. U. S. PAT. OFF.

A Division of Stewart-Warner Corp., 1856 Diversey Parkway, Chicago, Ill.

Stewart-Warner-Alemite Corporation of Canada, Ltd., Belleville, Ontario

WORLD'S LARGEST MANUFACTURER OF LUBRICATION PRODUCTS

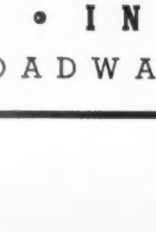
. . . why Flexible All Metal and Metal Lined Hose have been first choice of the Oil Industry for over a quarter century.

Long practical experience has amply proved to gasoline and oil industry executives that their special liquid handling problems require more than just ordinary types of hose. And the record of the past 25 years shows that of all types tested, Flexible ALL METAL and METAL LINED Hose have consistently demonstrated their superiority in performance and economy.

There are sound reasons for this in the tried and proved engineering principles which characterize all-metal and metal lined construction. They are explained for your information in our newly published "Fact Book of Flexible METAL Hose and Tubing" which we shall be glad to send you without obligation.

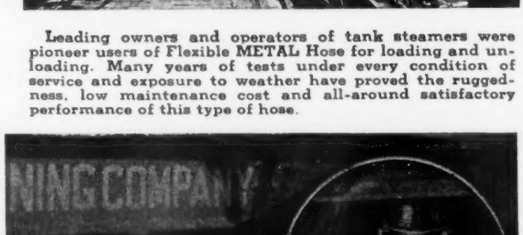
Here's your "FACT BOOK" . . . .

Get the FACTS about modern Flexible METAL Hose and what it is doing to cut costs, insure efficient operation, not only in your industry but in many other important fields.



Flexible METAL LINED Hose was first listed by Underwriter's Laboratories for gasoline pump service nearly a quarter century ago.

Leading owners and operators of tank steamers were pioneer users of Flexible METAL Hose for loading and unloading. Many years of tests under every condition of service and exposure to weather have proved the ruggedness, low maintenance cost and all-around satisfactory performance of this type of hose.



Nobody "babies" tank car loading and discharge connections. They have to take it day in and day out. That is why you will find Flexible METAL Hose a standard specification for this type of service.

Flexible METAL HOSE AND TUBING INSTITUTE

FLEXIBLE METAL HOSE AND TUBING

• INSTITUTE •

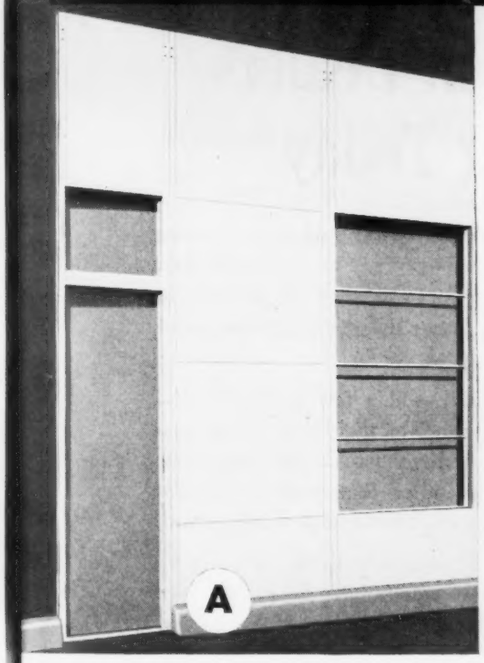
150 BROADWAY, NEW YORK, N.Y.

"HIGH VISIBILITY" *Designs*

AS SIMPLE AS "A-B-C"

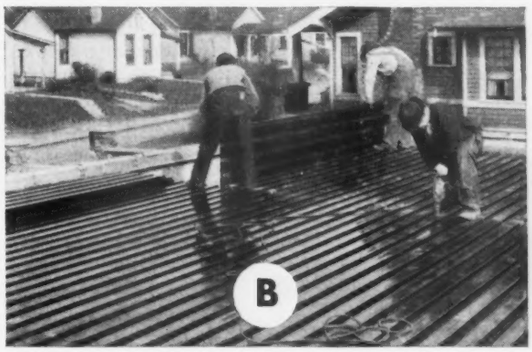
All-steel Porcelain Enamel Stations which permit of "visual selling"... the most modern merchandising method... have doubled and tripled the sale of oil, gas and other accessories.

Designed from the merchandising angle rather than from the architectural standpoint alone, the Austin prefabricated steel station is as simple in construction as "A-B-C."



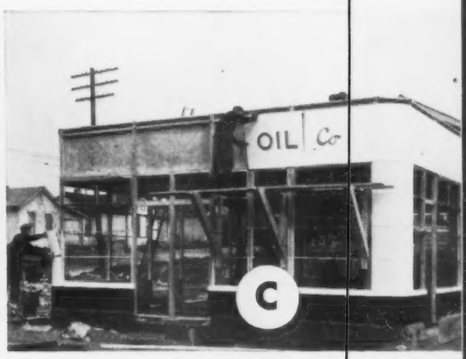
INTERIOR VIEW OF STANDARD WALL PANELS

The steel service station is not new, but the prefabricated Porcelain Enamel station is the all-steel station in its most modern form and dress. Assembled with standardized wall sections, either door, blank wall or sash panels which permit any floor plan arrangement desired.



LONG-SPAN CELLULAR TYPE STEEL ROOF DECK

The cellular type of long-span steel roof deck provides a flat ceiling on its underside which produces the streamline *interior*. Roof deck as well as walls are double insulated. Multiple-ply roof waterproofing and insulation are applied over the roof deck shown. Electric wiring and piping can be carried through the cells of the deck.



PORCELAIN ENAMEL PANELS FOR EXTERIOR

Insulated Porcelain Enamel panels are applied to the *exterior*. With this lifetime finish these stations are easy to clean and always stay bright and colorful. A NEW building always attracts attention . . . the Porcelain Enamel building always stays NEW . . . the secret of its everlasting sales appeal.

Views of Standard Oil (Ohio) Station of "High Visibility Design" showing streamline interiors made possible by the flush *interior* surface of panels "A" and long-span steel roof deck "B" for ceiling. All panel joints, walls and ceiling are flush. Walls and roof are doubly insulated.

Austin Service Stations provide low maintenance costs. They permit of individual designs . . . your own color combinations, lettering and architectural features can be incorporated in these designs. Prompt delivery of *panels from stock* speeds up completion!

The coupon below will bring you literature, prices and information based on your requirements, without obligation.

The Austin Company,
16112 Euclid Avenue, Cleveland, Ohio

☐ Please send me a copy of your "High Visibility" Designs Folder.

☐ We contemplate building ____ stations

Size approximately ____ x ____ with ____ lubritoriums.

Name _____

Firm _____

Address _____

City _____ State _____

THE AUSTIN COMPANY

Manufacturers and Builders of Porcelain Enamel and Luminous Buildings

THE AUSTIN METHOD

Service Station Division, 16112 Euclid Avenue, Cleveland, Ohio

WHY CAN'T I MAKE A BETTER LIVING?

That's the Question Many Service Station Dealers are Asking Today

LET'S FACE THE FACTS! Many service station dealers are making a bare existence out of their business. They have invested their money, put in long hours of hard work—yet they are not able to provide all of the necessities for a better living, let alone some of the added rewards they deserve.

They pump gasoline day after day—sell a few quarts of oil—change oil now and then—lubricate cars of their best customers—sell a few small accessories on a hit-and-miss basis—and do odd jobs requested by their patrons. Yet, the end of the month finds them just barely paying station operating expenses and providing food, clothing and shelter for their families.

Today there are only half as many automobiles for each service station as there were a few years ago, and the service station dealer cannot make the profits and attain the standard of living he rightfully deserves by just selling gasoline, oil and a few accessories and by doing a haphazard service job.

Is it any wonder they ask that question? Is it any wonder they lose interest in their business—give up their stations—seek other employment?

But There IS an Answer

The successful service station operator must round out his business—take care of *all* of his customers' automotive needs with selected products and services—and *make the added profits on those added sales!*

With gasoline and oil still the foundation of his business—still paying operation and overhead—and still providing a living for him and his family—the operator can *really live better* on the extra *profits* from a completely rounded out selling program.

FOR EVERY 1,000 GALLONS OF GASOLINE CONSUMED MOTORISTS ARE BUYING

- 20 GALLONS OF MOTOR OIL
- 10 GALLONS OF OTHER PETROLEUM PRODUCTS
- 10 LUBRICATION JOBS
- $24 WORTH OF TIRES AND TUBES
- $6 WORTH OF BATTERIES
- $14 WORTH OF ACCESSORIES
- $3 WORTH OF MISCELLANEOUS LABOR

GOODRICH PRODUCTS MEAN BETTER MOTORING . . . .

EVERY MOTORIST NEEDS AND WANTS THESE GOODRICH "Profit Headliners"

A tire line featuring the NEW GOODRICH SAFETY SILVERTOWN, *with the sensational new Life-Saver Tread.*

A line of tubes headed by the GOODRICH SEAL-O-MATIC SAFETY TUBE, the *two-way* life-saver inner tube that (1) automatically self-seals punctures and (2) changes rips and tears—that would normally cause blow-outs—into slow, safe leaks.

And topping a line of batteries for every motoring need and pocketbook is the GOODRICH KATH-ANODE ELECTRO-PAK—the battery that's *guaranteed as long as the motorist owns his car.*

THE GOODRICH AUTOMOTIVE ACCESSORY LINE—a full line of heaters, fan belts, radiator hose, polishes, waxes, cleaners and many other profitable items.

Goodrich Provides a Complete Merchandising Program Especially Designed for the Service Station Dealer

● The B. F. Goodrich Company, America's oldest tire manufacturer, after thorough study of the service station operator's problems, has developed a proven Merchandising Program that provides this *extra margin of profit* which means the difference between *living* and *better living.*

Thousands of aggressive service station operators have applied the Goodrich All-Season, All-Market program with unqualified success. Any dealer can combine this plan with his present petroleum program with equal success.

The Goodrich Program is three-fold:

1. ***Product***—A complete line of tires, tubes, batteries and accessories that offer outstanding safety, comfort and economy to meet the needs of every type of buyer—and return a fair profit to the dealer.

2. ***Advertising***—Powerful national advertising, local newspaper and direct mail campaigns, radio, identification and display to tell motorists about Goodrich products and where to buy them.

3. ***Selling Helps***—Motion pictures, slide films, selling manuals, demonstration kits and personal assistance to instruct the dealer and his employees in profitable merchandising methods.

Find Out How Goodrich Can Help Any Dealer Make a Better Living

The whole story is told in the new Goodrich talking motion picture, "You're the Doctor," available for showing to interested groups of dealers and marketing officials anywhere.

An outline of the Goodrich Program is available in booklet form. And is yours free. No obligation.

SEND IN THIS COUPON TODAY!

The B. F. Goodrich Co.
Department 676, Akron, Ohio

I am interested in knowing more about your program. Please send me, without obligation, a copy of the booklet, "You're the Doctor."

Name.....

Address.....

Please check whether you are a wholesaler or retailer.
☐ Wholesaler ☐ Retailer

Better Profits For Dealers!

EVERY MONTH IS A GOOD MONTH for LION Naturalube Jobbers

N. | FEB. | MAR. | APRIL | MAY | JUNE

THIS NEW TYPE MOTOR OIL OPENS NEW SALES FIELDS New Profits

INTERESTS PROSPECTS

CONVINCES PROSPECTS

CLINCHES SALES

LION Naturalube's remarkable properties always interest a prospect. Refined from a rare crude oil Naturalube has valuable properties not possessed by oils of other types — a stronger, natural protective-film and the ability to remove hard carbon. These properties are inherent and not brought about by additives.

Use Lion's pre-tested, successful merchandising methods. Demonstrate with light handy apparatus the visual and understandable proof of Naturalube's money-saving features. Show prospects the results of service tests made by motorists, fleet owners, tractor owners and operators of other gasoline and Diesel engines .. tests that prove Naturalube saves wear — conserves power — saves fuel.

Use the Naturalube money-back guarantee to win the prospective buyer's confidence and clinch his order. Lion guarantees to give your customer his money back if he does not think Naturalube is the best oil he ever used. No matter what motor oil you are now selling, it will pay you to investigate the added profit possibilities of Lion Naturalube.

LION OIL REFINING COMPANY
El Dorado, Arkansas

Write, wire or
Lion Oil Refi
Company, El Do
Arkansas, or Pe
leum Exchange C
poration, 8 Sou
Michigen Avenue
Chicago, Illinois
Complete literature
will be sent upon
request.

THE SAFE OIL FOR CARS, TRUCKS, TRACTORS AND DIESEL

Money-Making Merchandising

Interior of one of the Fruehauf Merchandisers operated by Standard Oil of Kentucky, showing the wide range of Standard products—batteries, oils, greasing equipment, etc.—which it displays. This unit travels through southern states, accompanied by a salesman who conducts sales educational meetings for Standard dealers . . . Exterior of Standard's Merchandiser has attractive, racy lines, is effective advertising as it rolls down streets and highways.

A NEW means of keeping dealers posted on product developments. A modern way of relaying new, effective selling methods to your sales organization. Fruehauf's Merchandiser is a display room on wheels, a traveling sales school—a business tool designed for money-making merchandising . . . Fruehauf Trailers will help you sell—and make it possible for you to deliver merchandise faster, more economically, after the sale. For complete information on the Merchandiser, on Fruehauf Tank-Trailers, Stake and Rack or Van-Type Trailers, see your nearest Fruehauf Branch—or write us at the factory.

World's Oldest and Largest Manufacturers of Truck-Trailers
FRUEHAUF TRAILER COMPANY - Detroit, Mich.
Sales and Service In Principal Cities

Standard Oil of Ohio uses this Fruehauf Type "F" Trailer to insure swift, economical deliveries to dealers. Tires, batteries, and packaged accessories (which dealers appreciate receiving in clean condition) are placed on special shelving that extends around the interior walls of the Trailer, thus escape contact with the drums of oil and grease that line the floor of the van . . . Standard's Type "F" can pack away a lot of merchandise, but it's easy to handle and easy to look at.

Standard Oil of Ohio operates a fleet of Fruehauf Tank-Trailers, too—this one a 1600-gallon, 6-compartment unit.

FRUEHAUF TRAILERS FRUEHAUF TRAILERS *"Engineered Transportation"* REG. U. S. PAT. OFF.

In Step With Progress and Profit . . .

THIS week, National Petroleum News again salutes the Marketing Division of the Oil Industry. This time at the dawn of a new era in retailing.

Today, when an oil man bids for the patronage of the public, he knows he is in competition with fast-stepping retailers in every branch of merchandising.

A merchant realizes that the dollar the motorist spends in a service station can't be spent again in his store.

Successful retail merchants know the public judges quickly —once for all—by the APPEARANCE of retail establishments, those it chooses to patronize.

Americans have no patience with the oldfashioned—whether it is in motor cars, apparel or service stations.

Style — Fashion — Newness —these are outstanding factors in building business.

So, in this issue of NATIONAL PETROLEUM NEWS, oil men will find out what "the well-dressed station will wear."

Much midnight oil has been burned recently by designers over their drafting boards.

Equipment manufacturers have invested great sums to build labor-saving, efficient, handsome equipment.

Station manufacturing and construction companies have found what the public wants. They have built service stations which meet these demands for speedy service, modest investments, low upkeep.

The Oil Industry with profit is adopting the modern creations of these designers, builders and manufacturers.

To the amazement of foreign visitors, we Americans scrap skyscrapers, motor cars and transportation systems long before they are worn out.

Visitors think it extravagance. Americans prove that they discard the old, adopt the new, in order to move on to faster progress and greater profit.

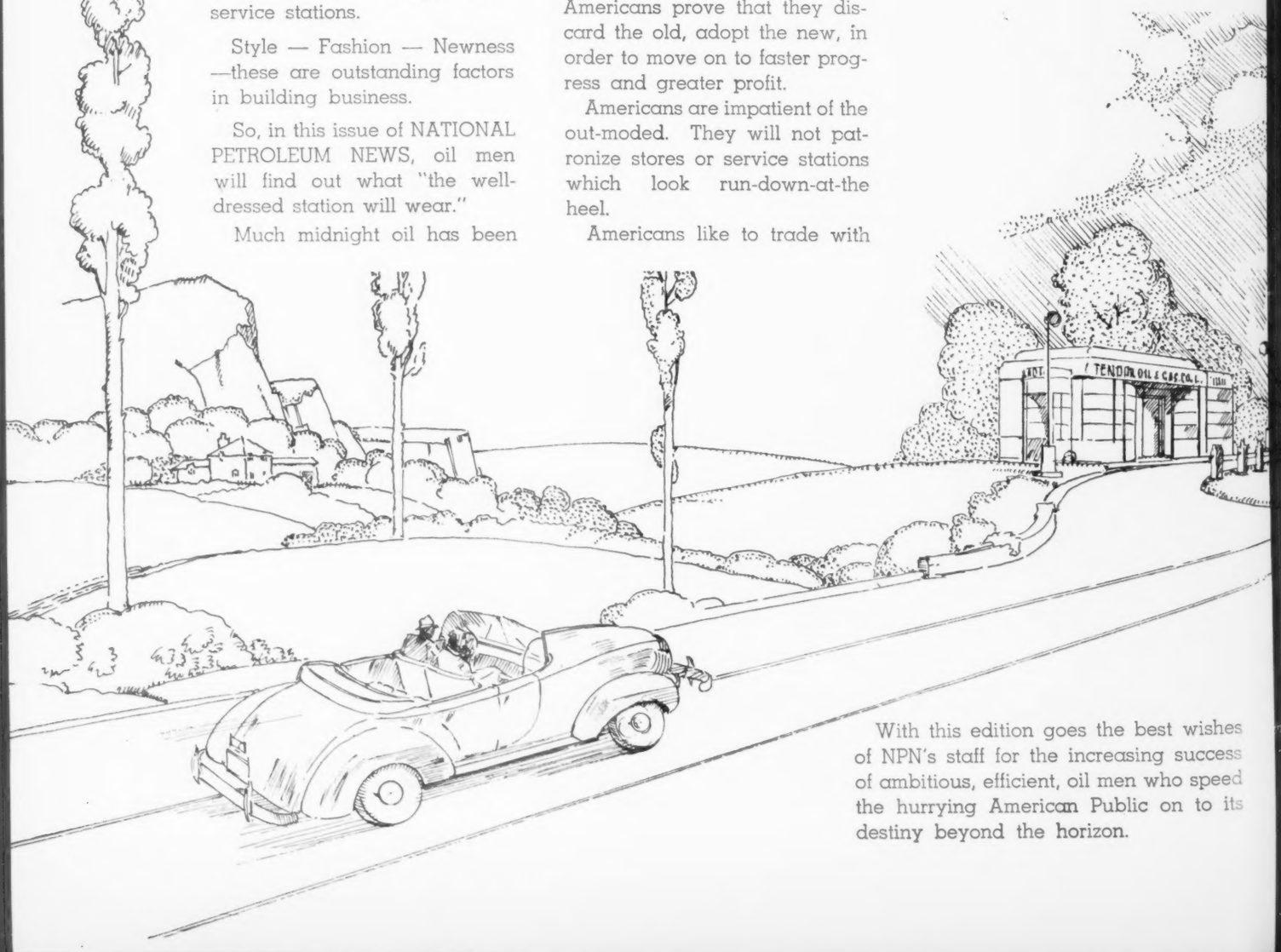
Americans are impatient of the out-moded. They will not patronize stores or service stations which look run-down-at-the heel.

Americans like to trade with the successful retailers. Rightfully, or not, Americans seem to judge success largely by APPEARANCE.

To catch these hurrying Americans, service stations must not only BE RIGHT they MUST LOOK RIGHT.

As our contribution to better retailing, we devote this edition of NPN almost exclusively to new ideas by which oil men can meet the increasing, stiff competition at service stations.

The entire edition, editorial and advertising columns alike, is intended to be a handbook to guide oil marketers in what to do and what to avoid in the building, operation and management of service stations.



With this edition goes the best wishes of NPN's staff for the increasing success of ambitious, efficient, oil men who speed the hurrying American Public on to its destiny beyond the horizon.